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JOB OPENINGS SURVEY IN MASSACHUSETTS MARCH THROUGH SEPTEMBER 1979

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81/168

Massachusetts Division of Employment Security

job market research

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JOB OPENINGS SURVEY
IN MASSACHUSETTS
MARCH THROUGH SEPTEMBER 1979

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ACKNOWLEDGEMENTS

We extend our sincere appreciation to the many employers who voluntarily participated in the Job Openings Survey. Without their cooperation and support this report would not be possible.

Acknowledgement is also made to the United States Department of Labor and in particular to the Bureau of Labor Statistics both on the National and Regional level for their encouragement and technical support.

We also wish to express appreciation for the excellent support provided by Evelyn Forman for her control and processing of the survey, John McCormack for his assistance in analyzing and reporting the survey data and Donna Mangone for her typing of this report.

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INTRODUCTION

A Job Openings Survey (JOS) was initiated in Massachusetts in 1979. The survey represents the only available comprehensive source of actual current job openings. This report is based upon the tabulated results of the first three quarterly JOS surveys (March, June and September 1979). Fundamentally, it will present us with estimates of the intensity of demand for workers in various occupational and industrial groups as well as relate this demand for workers to other variables such as unemployment, new hires, part-time openings, future openings, hard-to-fill openings, size of establishment and completions from training programs. Comparisons will be made with other measures of demand such as Division of Employment Security (DES) Occupational Employment projections and the DES Job Bank. The soundness of the vacancy rates is accomplished by limiting the occupations discussed in this report to those with less than a 50 percent relative standard error.

Information on job vacancies is useful in many ways. Perhaps the most fundamental use is as a means of diagnosing the causes of unemployment. Data on the industrial and occupational composition of current job openings are useful in determining whether periods of high unemployment are caused by structural imbalances (i.e. mismatch of skills) or the lack of aggregate demand (i.e. too few jobs). These factors and others no doubt operate during periods of high unemployment. Determining the degree to which these factors affect unemployment is the key to the development of appropriate strategies to combat unemployment.

More specifically, job vacancy statistics can assist manpower planners in targeting training resources to particular areas of occupational shortages. Through comparisons of levels of unemployment and openings within occupations, planners can obtain information on those occupations in which current labor shortages exist. Through the use of job vacancy data, in conjunction with knowledge of industry employment growth and the occupational composition of industries, job development and placement activities can be more effectively targeted to match the needs of employers. The individual job seekers can also benefit by knowledge of demand occupations.

A major impetus to conducting job openings surveys occurred in the early 1960's -- a period of persistently high unemployment and sustained business expansion. To explain this anomaly, the President formed the Gordon Committee to appraise employment and unemployment statistics. High on the list of recommendations was further research on the feasibility of measuring job vacancies. The committee concluded that: "It is doubtful that any suggestions for the improvement of knowledge about the nation's labor market was more frequently voiced to this committee than that calling for vacancy statistics".

In mid-1964 the Bureau of Labor Statistics in cooperation with State Employment Security Agencies began pilot studies to examine alternative data collection methods, test job vacancy definitions and analyze data quality through a Response Analysis Survey (RAS). These pilot surveys were conducted in various SMSA's scattered throughout the country from late 1964 through April 1966. Response rates on most surveys exceeded 80 percent and few differences were observed among alternative survey solicitation methods or alternative survey schedules. The RAS findings were also quite favorable with only a small percentage of firms mis-reporting their job openings, leading to a 3 percent understatement of openings.

In early 1966, BLS proposed that job vacancy data collection be linked with the existing Labor Turnover Survey (LTS) program in order to reduce response burden, lower the cost of collection, and link the two sets of statistics for better labor market analysis. The combined Job Openings and Labor Turnover Survey (JOLTS) continued with some degree of success until 1973. In 1968, an amendment to the Manpower Development and Training Act (MDTA) included a mandate to collect job openings data nationwide by occupation and industry. However, in 1973 the BLS decided to cancel the Job Vacancy Program because the data could not be used for direct placement and there was not enough occupational and industrial detail to satisfy the needs of labor market analysts.

In fiscal years 1977, 1978 and 1979 Congress again appropriated funds to develop a survey to regularly collect job openings data. The data used in this report was gathered in a pilot Job Openings Survey (JOS). The JOS is a joint Federal/State effort in which Massachusetts and three other states, Utah, Texas and Florida, participated. The purpose of the survey was to help determine the scope of the data that can be collected, the best means to collect the data, and the cost of an ongoing nationwide survey.

As to the feasibility of collecting job vacancy data, the Massachusetts experience during the first year of the JOS has proven that estimates on the level and rate of current job openings by occupation can be produced, providing a measure of total unmet demand for labor and to some extent a reliable measure of unmet demand in specific occupational groups. To a much lesser degree, the JOS has resulted in reliable information on openings unfilled 30 days or more, part-time openings and openings with future starting dates.

The JOS in Massachusetts collected data from a stratified random sample of approximately 1,200 private nonagricultural wage and salary establishments. Stratification was by industry, employment size and location. The universe from which the sample was taken is the State Unemployment Insurance file and thus is a fair representation of the state's industrial mix. The limited size of the sample, however, generally resulted in sampling errors large enough to preclude a valid comparison of occupational data between surveys. The results of the March, June and September 1979 surveys were, therefore, averaged.

The collection of information was by means of two printed schedules that were mailed to the sample establishments. Half of the establishments received a long structured form listing 146 occupational groups. The other half received a short structured questionnaire listing 70 occupations (See Appendix L). Prior to the first mailing, phone contacts were made to initiate the collection process. In the initiation stage, participation was solicited, addresses were confirmed and a contact person was identified. Following the first mailing, telephone contacts were made both to remind non-respondents and as an alternative means of data collection from establishments not returning the mailed schedule. Although the data collection by phone was not part of the original BLS survey design, it was so successful in increasing the rate of response from employers that it was incorporated in the BLS methodology for all states involved in the survey.

Shortly after the completion of the first round of the survey, a Response Analysis was made to evaluate the quality of the data, through personal visits to a subsample of establishments. Organizational structures of firms, their hiring practices and record keeping methods were checked for use in identifying potential sources of error in the job vacancy data. The data were found to be highly accurate.

For a more detailed description of the design, implementation and account of the Massachusetts experience in the first three surveys (March, June, and September 1979), please refer to our "Technical Report-Pilot Job Openings Survey in Massachusetts 1979".

As previously mentioned, this report deals exclusively with data from the first three rounds of the pilot JOS program. In the future, a follow-up report containing the results of the second three survey rounds, December 1979 and March, and June 1980 will be published. Several changes were made in the second phase of the survey. A request for new hires information was included in the schedules in order to assess the intensity of demand for workers by measuring how well employers are able to fill this demand. An unstructured schedule was introduced in the survey. This form was mailed to all firms with establishments employing less than 50 workers. Data was then collected by either telephone or personal visit.

A "triplet" study, consisting of three matched samples of firms employing less than 50 persons, was assigned to different interviewers on a rotating basis to eliminate interviewer bias. The study tested differences in response to telephone and personal visit solicitations. A "diary" study examined the daily recruiting and hiring practices of a sub-sample of 100 establishments for the purpose of both clarifying definitions of terms used in the survey (such as hard-to-fill openings and future openings) and to determine if the last day of the month is a representative day for inquiring about job openings.

Although the BLS contract with the DES ended with fiscal year 1980, the Massachusetts Division of Employment Security will continue the survey without BLS support for four additional quarters. The JOS represents the only available comprehensive source of actual current job openings. It can serve a vital function in formulating policy decisions by helping to identify the causes of unemployment, in formulating training plans by helping to identify skill shortages, and in improving labor market analysis by providing information on an important missing element of labor market demand. It is our hope that the BLS will make the JOS a national survey in fiscal year 1982. The continuation of the Massachusetts JOS program in the interim, will keep intact a staff of personnel with years of experience in survey technique and an existing survey apparatus that would be of great value for future continuation of job openings studies and related research projects.

I Summary

The first three rounds of the Massachusetts pilot Job Openings Survey, with reference dates of March 31, June 30 and September 30, 1979 produced an average of 68,391 openings. This translates into an overall vacancy rate of 3.1 percent. Although half the establishments in the sample received a long structured questionnaire listing 146 occupations, data was tabulated and condensed into the 70 occupational groups listed in the short structured form. Forty out of the seventy occupational groups covered by the short survey questionnaire were selected for publication in this report because they met our established criteria of reliability. Job vacancy rates in these selected occupational groups ranged from a high of 13.3 percent for machinists to a low of 0.6 percent for civil engineers.

White collar jobs (professional, technical, managerial, sales and clerical occupations), represented 46.7 percent of all openings in Massachusetts. Approximately one in five job openings were in the professional and technical occupations. Among engineering occupations in the state, vacancy rates were highest for mechanical engineers (7.0 percent), and electrical engineers (5.5 percent). There is reason to believe, however, that these figures could be underestimated. First, a lower than average response rate among large high-technology establishments possibly biased the demand for engineers. Secondly, newly-created firms in the rapidly expanding high technology sector were not included in the sample.

Closely related groups of occupations experiencing a high vacancy rate were the computer, mathematical, and research occupations (7.7 percent). Since systems analysts represent 75 percent of the employment in this group, we believe that the demand for that occupation alone is even higher. There is further evidence that openings for systems analysts as well as programmers (6.5 percent) may also be undercounted because of the high technology industry response. The underrepresentation could also exist among the technologists and technicians, except health occupational groups.

In Massachusetts, with some of the most prestigious medical and health facilities in the world, vacancy rates in health occupations are high: registered nurse, 4.9 percent, licensed practical nurse, 6.6 percent and therapists and dieticians 7.8 percent. Much of the high demand is due to need for specialization among nurses. Many openings exist because of inconvenient shifts. In these female-dominated occupations, child-care and home responsiblities further limit the number of eligible applicants. A common reason for vacancies among nurses aides, orderlies and attendants (6.2 percent) is the high turnover due to low pay and difficult work shifts.

Among clerical occupations the computer-related data typists occupation had the highest vacancy rate (5.4 percent). The future outlook, however, is mixed because of technological change in this field. Bank tellers (3.8 percent) are also affected by automation of clerical processes, but the innovations seem to result in expansion of banking services. Typists, (2.5 percent) and bookkeepers and accounting clerks (1.9 percent) will still need to meet replacement demand even though some losses will occur due to automation. The demand for secretaries (3.3 percent), however, will remain fairly high because the occupation requires public contact and organizational skills. It is significant that the vacancy rate for secretaries is higher than the overall rate, considering the number of persons (80,000) already employed in the occupation.

In the blue collar group, machinery occupations had a high vacancy rate. The highest vacancy rate in the Job Openings Survey was recorded among machinists, (13.3 percent). The rate was 70 percent higher than that of the next highest occupational group. High rates were also recorded for tool and die makers (6.4 percent). Replacement demand in these occupational areas is high. The lower vacancy rate for machine operators (2.5 percent) lends some credence to the belief that the vacancy rate for machinist may have been somewhat overstated and that for machine operator understated because of ambiguity in job definitions. Even so, the machinist occupations would still possess the highest vacancy rate in the survey.

By major industrial divisions, the survey results in two distinct profiles. Manufacturing with 31.0 percent of employment had 28 percent of the openings (19,000) and a 2.8 percent vacancy rate, while nonmanufacturing with 69 percent of employment had 72 percent of the openings (49,000) and a vacancy rate of 3.2 percent. Thirty-three percent of manufacturing openings were hard-to-fill (unfilled 30 days or more) compared to only 27 percent for nonmanufacturing. The high percentage of hard-to-fill manufacturing openings were the result of skill shortages in many professional and technical occupations. Only 5 percent of the openings in manufacturing were for part-time jobs compared to 21 percent in nonmanufacturing.

A few generalizations can be made about the relationships between employment size of establishments and the number of openings and vacancy rates in each size class. Although smaller size classes contain the vast majority of establishments, the larger size classes (250 employees and above) account for over 40 percent of total employment. The largest concentration of openings, however, (44 percent) were in establishments ranging from 20 to 249 employers. Openings dropped off sharply in the 250 and above size class. Size class 1,000 and above accounted for 21 percent of employment but only 12 percent of openings.

A similar trend can be detected in the vacancy rates by size class. Generally, the smaller the size class, the higher the vacancy rate. Thus, units with 1 to 3 employees had nearly a 10 percent vacancy rate compared to a 4.3 percent rate for firms employing 50 to 99 workers and only a 1.8 percent rate for firms employing more than 1,000 workers.

II Vacancy Rates by Occupational Group

For the purpose of analysis, vacancy rates for selected individual occupations will be examined in groups of similar occupations (see Table 1).

In analyzing the occupations, keep in mind that the overall job vacancy rate in Massachusetts, as measured in the first 3 rounds of this survey, is 3.1 percent. This rate could be considered the median point between high and low vacancy rates. Anything above 3.1 percent could be considered on the high side and anything below this on the low side.

Job vacancy rates were calculated by dividing the number of job openings by the sum of employment 1/ and job openings. ($JVR=\frac{JO}{JO+E}$) It must be remembered that a high vacancy rate does not necessarily mean an occupation has a high number of job openings. The relationship of the job vacancy rate to the number of job openings is contingent upon the employment base of the occupations. For example, the occupational category computer, mathematical, and operations research occupations has 711 openings with a vacancy rate of 7.7 percent, while the category "other clerical" occupations has 3,588 openings with a vacancy rate of 1.3 percent. The explanation lies in the employment figures. Where the computer, mathematical, and operations research occupations have an estimated employment of only 8,520, "other clerical" occupations employment numbers 275,720. It is obvious that some occupations are more selective than others. The job vacancy rate is a truer measure of demand for these selective occupations than is the number of job openings.

A. White Collar Occupations

1. Engineers

In the engineering category we find the highest vacancy rates in the mechanical and electrical engineering occupations.

SOC	OCCUPATION	EMPLOYMENT	JOS OPENINGS	VACANCY RATE
1635	Mechanical Engineer	8,760	662	7.0
1633	Electrical & Electronic Engineers	17,620	1,025	5.5
1602	Other Engineers and Architects	22,550	562	2.4
1628	Civil Engineers	5,440	33	0.6

1/ Employment figures are based on the Occupational Employment Statistics (OES) Survey. See the appendix for a further explanation.

This fact is not surprising when we consider the extent of high technology industries in Massachusetts. According to a report prepared for the Massachusetts Executive Office of Economic Affairs; "Compared to its position within the U. S. manufacturing sector as a whole, Massachusetts commands a disproportionately large share of the employment in the nation's high technology sector".2/ These high technology firms have a need for engineering professionals to maintain Massachusett's position as a leader in the research and development of new technologies. In evidence of this, the report to the Executive Office of Economic Affairs states: ".... professionals with 4 year college degrees, predominantly in engineering disciplines, account for 25 - 30 percent of total employment in a typical high technology company. In contrast, college degree professionals typically represent less than 5 percent of total employment in low technology industries such as apparel, textiles and leather goods".3/ It is evident that engineering jobs are in such high demand because of the growth of high technology industries in Massachusetts.

A surprising result of the JOS survey was the fact that mechanical engineers had a higher vacancy rate than electrical engineers. It is generally agreed that electrical engineers are needed more by the high technology industries in Massachusetts. According to a recent D.E.S. report: "Engineers will be in very high demand throughout the projection period (3.0 percent annual growth rate to 1985). Specifically, electrical engineers will be strongly recruited by Massachusetts high technology firms (4.0 percent annual growth rate). While more students are now enrolling in engineering than during the early 70's, a legitimate concern is that the increased supply will not come close to matching the demand being generated by high technology firms". 4/ However, the 5.5 percent job vacancy rate does not reflect the perceived current demand for electrical engineers in Massachusetts. We can consider the following possibilities concerning an assumed shortage greater than that measured by the 5.5 percent vacancy rate.

a. The assumed shortage is more a projection of expected future demand rather than what is currently happening at the time of the survey. If future expectations are more real than imaginary, subsequent JOS surveys should begin showing higher rates.

b. The assumed shortage is not that severe.

c. The assumed shortage is real. We looked at the survey itself to see where the survey could be deficient in measuring the demand for electrical engineers. In doing this we find that the growing high technology firms may have been underrepresented in the survey. The reasons for this include:

    (1) The sample was drawn from a March 1978 listing of Massachusetts firms subject to the unemployment insurance tax laws. Even though this listing includes virtually all private non-agricultural wage and salary employment in the Commonwealth of Massachusetts, the problem lies in the one-year gap between the sample frame and the

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2/ High Technology Enterprise in Massachusetts - Its role and its concerns, Technical Marketing Associate Inc., October 1979, P. 41.

3/ Ibid., P. 59.

4/ Employment Requirements by Occupation by Industry 1976-1985. Massachusetts Division of Employment Security, Occupation/Industry Research Department, P. 20.

first JOS survey in March 1979. In this time gap new firms have come into being which were excluded from the sample frame. In the dynamic and rapidly expanding high technology industries we would be unable to measure the job openings of new firms that come into being during this time. This could downwardly bias estimates for such occupations as electrical engineers.

(2) The JOS survey is voluntary and, unfortunately, some of the key large high technology firms in the State did not respond to the survey (see Section XVI). In any sample there is a certain degree of relative error simply because it is a sample rather than a universe. Any erosion of the sample further increases the probability of error in computing estimates. We feel the lack of response from certain large high technology firms caused a downward bias on the demand for electrical engineers. It is interesting to note that the average size of high technology firms that responded to the survey was 855, while for those that did not respond it was 2,274. This lack of response from high technology firms has been evident in other voluntary surveys conducted by the DES, specifically, the Occupational Employment Statistics survey, which has been singled out in the TMA report as receiving very little cooperation from high technology. The report states: "The second purpose addressed the State's inability to develop adequate data on the occupational characteristics of the industries in this sector. This information collected by the D.E.S. from companies who submit it on a voluntary basis is needed to provide direction for the State agencies involved in occupational education and training. Unfortunately for this sensible objective, many of the high technology sector companies refuse to cooperate in this program because they have found the data collection task both time-consuming and frustrating.....Perhaps industry is "seeing more red" on this subject than it warrants on its own merits, but since it will be shown later in this report that industry is ultimately the worse off for it, TMA can only conclude that both parties would benefit from a joint effort to work out a compromise reporting system". 5/ We would agree with this assesment. It is our contention that while the 5.5 percent vacancy rate may somewhat underestimate the actual need for electrical engineers in Massachusetts, it is still a fair indication of existing demand.

2. Systems Analysts and Programmers

Along with engineering, the occupations associated with the computer field would have to be included among those growing rapidly because of the rise of high technology in Massachusetts. The JOS survey has two professional categories which include jobs in the computer field: computer, mathematical, and operations research occupations and programmer.

5/High Technology Enterprise in Massachusetts - Its Roles and Its Concern, Technical Marketing Associates Inc., October 1979, P. 39.

The category computer, mathematical, and operations research occupations includes the computer systems analyst along with such occupations as operations research analyst, mathematician, statistician, actuary etc. According to Occupational Employment Statistics (OES) survey profiles, it is estimated that approximately 75 percent of those employed in this group are computer systems analysts. This group had a vacancy rate of 7.8 percent, the third highest in our group of forty occupational categories. If computer systems analysts could be isolated from it occupational group, its vacancy rate would undoubtedly be higher. There is a definite need for top level computer systems analysts in Massachusetts.

The occupation of computer programmer is the main training ground for many of the systems analysts working in the field today. A Bureau of Labor Statistics publication states that for the occupation computer systems analyst: "Prior work experience is important. Nearly half of all persons entering this occupation have transferred from other occupations, especially from computer programmer. In many industries, systems analysts begin as programmers and are promoted to analyst positions after gaining experience".6/ Therefore, in analyzing the occupations of computer systems analyst and programmer we should be aware of the relationship between the two.

The vacancy rate for programmers in the JOS survey was 6.5 percent. As we stated for electrical engineers, this rate may slightly underestimate the true need for programmers in the state because of the lack of response from key large high technology firms and the time gap between sample selection and initiation of the survey. It is interesting to note that 60 percent of the estimated openings for programmers were open one month or longer, which indicates a certain degree of difficulty in filling these positions.

There is considerable evidence that the occupation of computer programmer is a high demand occupation in Massachusetts. It should be of interest to government manpower planners who are seeking to train qualified people for immediate entry into the job market. There are numerous underemployed liberal art graduates with the right aptitudes who could be targeted for training. Educational institutions are expanding or instituting computer science curricula to meet the demand. We would certainly advise future college students to seriously consider the computer science field as a possible major concentration of study.

3. Technologists and Technicians, except Health

The occupational group "other technologists and technicians, except health" had 2,178 openings and a vacancy rate of 4.5 percent. Among the type of technicians included in this group are engineering technicians, drafters, surveying technicians, scientific technicians, legal technicians, etc. Many of these occupations are of special interest because of their representation in the high technology sector of the Massachusetts economy.

6/ Occupational Outlook Handbook 1980-81, U. S. Department of Labor, Bureau of Labor Statistics.

Since electricians, technicians, and drafters account for approximately 50 percent of the employment in this occupational group and other engineering technicians account for approximately 32 percent, the relatively low job vacancy rate is significant. If we assumed that all openings in this group were specifically for electronic technicians and drafters (an unrealistic assumption), the job vacancy rate for these two occupations would be 8.7 percent. If we assumed all openings were for electronic technicians, drafters, and other engineering technicians (a more plausible assumption) the job vacancy rate for this occupational group would be 5.5 percent.

Still, the overall 4.5 percent rate for the technician group may be somewhat low in terms of the impact of the growing high technology industries in this state. As for electrical engineers, the number of openings in the complementary profession of electronic technicians could have been underrepresented in the JOS survey.

The similarities concerning supply and demand between electrical engineers and electronic technicians in their respective disciplines was commented upon in a recent DES publication. Having previously mentioned the problem of supply and demand concerning electrical engineers the report states: "A similar situation exists in the engineering and science technician category (3.0 percent annual growth rate), where electrical and electronic technician jobs are expected to rise 5.0 percent annually. Local industry, however, may face a serious challenge in recruiting the volume of technicians needed to staff its operations".7/ Unfortunately the JOS survey was not set up to give us detailed information on the various types of technicians, thus enabling us to compare our results with the above statements. We can only surmise from our experience with the survey that a good percentage of the 2,178 openings were for electronic technicians, with demand much stronger for the experienced technician.

4. Natural Scientists

The natural scientist category includes such occupations as physicist, chemist, geologist, etc. This small specialized occupational group had a vacancy rate of 3.8 percent. These professionals are needed as teachers by colleges and universities and for research and development in the private and government sector. These scientists will be highly involved in solving the problems of the 1980's such as energy conservation and pollution. According to a Bureau of Labor Statistics Report college graduates through the 1980's should find that: "Energy exploration and development will create demands for geologists (+14 percent) and chemists (+24 percent).8/ The percentages indicate a ten year national growth rate

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7/ Employment Requirements by Occupation, by Industry 1976-1985, Massachusetts Division of Employment Security, Occupation/Industry Research Department. P. 24.

8/ "Employment Outlook for 1980 College Graduates in New England", U. S. Department of Labor, Bureau of Labor Statistics, P. 16.

for chemists above that for all employment (+21 percent). Many of the openings for geologists will be outside of Massachusetts. The physicist occupation, however, is relevant to the Massachusetts economy as many physicists teach and do research in colleges and universities or work in private industry in companies that manufacture aerospace and defense related products.

5. Health Occupations

SOC	OCCUPATION	EMPLOYMENT	JOS OPENINGS	VACANCY RATE
3000	Therapists & Physician's Assistant, Pharmacists, Dieticians	8,637	340	7.8
3660	Licensed Practical Nurses	17,277	1,213	6.6
5236	Nurses Aides, Orderlies & Attendants	39,745	2,625	6.2
2900	Registered Nurses	42,954	2,192	4.9
3602	Other Health Technologists & Technicians	23,088	412	1.7

The vacancy rates for health occupations in Massachusetts show a consistent need for health-care personnel. This need is not surprising considering Massachusett's many fine hospitals and health-care facilities. Also contributing to the demand for health-care workers are the public's increasing health consciousness, expansion of medical insurance coverage, and increased expenditures by Federal, State, and local government for health care and services.9/ The future opportunities in these fields look good because they are relatively unaffected by changing economic conditions.

A vacancy rate of 7.8 percent for the occupational category pharmacists, dieticians, therapists, and physician's assistant was the highest recorded among the health-care occupations. This category contains four distinct occupations which makes it somewhat difficult to analyze. Based on the fact that few pharmacies were included in the sample, and that the occupation physician's assistant is a fairly new occupation with a very small employment base we can deduce that the majority of openings in this category are for therapists and dieticians. The therapist group includes physical, occupational, and respiratory therapists, as well as audiologists and speech pathologists.

In the nursing occupations we find a high demand for both registered and licensed practical nurses. The vacancy rate for L.P.N.'s is 6.6 percent as compared to 4.9 percent for registered nurses. In terms of openings, however, registered nurses have 2,192 openings as compared to only 1,213 for L.P.N.'s. Lower wages and less appealing work mightbe one reason for the higher vacancy rate among L.P.N.'s. The vacancy rate and job openings for nurses aides, attendants, and orderlies (classified as a service occupation) was also high at 6.2 percent and 2,625 openings respectively.

9/ Occupational Outlook Handbook 1980-81, U.S. Department of Labor, Bureau of Labor Statistics, P. 364.

In the registered nurse category the vacancy rate is due mainly to a shortage of registered nurses to fill all available positions. This shortage allows nurses in many cases to choose the geographic area in which they wish to work, and as a result certain areas do suffer more of a shortage than others. Some hospitals may be able to fill their day shift positions, but night and weekend coverage may suffer because of the shortage. In field interviews it was learned that specialty nursing positions such as nurse practitioners, psychiatric, and surgical nurses were very hard to fill, especially in night and weekend shifts. Finally, the female-dominated occupation of registered nurse is subject to people leaving this field, at least temporaily, because of family and child-care responsibilities.

The L.P.N. occupation also had a high vacancy rate which could be attributed to some of the same conditions which influenced the rate for R.N.'s, namely the shortage of personnel, inconvenient shifts, and females leaving the occupation for family responsibilities. In the category of nurses aides, orderlies, and attendants, the least professional of the nursing occupations, some of the vacancies may be due to employees voluntarily leaving the occupation to seek other jobs. The jobs are relatively low paying. One suburban hospital noted that, except for students and housewives, a local pool was not available to fill these positions. The cost of private transportation and lack of public transportation has made it difficult for people who would take these jobs, to commute from less affluent communities. In this age of decreased mobility due to the rising costs of owning and operating an automobile, perhaps government and employers can get together to provide transportation for those workers willing to commute to available jobs.

6. White Collar Occupations with Moderate to Low Vacancy Rates

The following white collar occupations all have a vacancy rate under the overall Massachusetts rate of 3.1 percent.

SOC	OCCUPATION	EMPLOYMENT	JOS OPENINGS	VACANCY RATE
1412	Accountant & Auditors	21,656	669	3.0
4100	Sales Occupations, Commodities	135,730	3,409	2.4
4302	Other Marketing & Sales Occupations	14,753	322	2.1
1900	Social Scientists & Urban Planners	4,378	63	1.4
1102	Other Executive, Administrative & Managerial Occupations	203,162	2,353	1.1

In some of these occupations, the lower relative demand is not surprising since Massachusetts has the labor pool to successfully fill a large number of the positions. The many colleges and universities turn out well trained candidates for accounting, executive, administrative, managerial, and social scientists and urban planning occupations. On the national level accounting is expected to grow faster than average for all occupations,10/but the number of qualified candidates in Massachusetts has tempered the demand to a moderate 3.0 percent vacancy rate.

In the commodity sales occupations we find a relatively low vacancy rate of 2.4 percent, but a large number of actual openings (3,409). In this category we include occupations ranging from technical sales representative to sales clerk. These jobs are available to both college graduates seeking a career and to housewives seeking part-time work. A technical sales position often requires a college degree in an appropriate discipline in order to gain the competence necessary to sell the product. Many of these positions are available in high technology firms. A sales career should be given consideration by liberal arts graduates who are unable to find work in their chosen fields. A recent Occupation/Industry Research publication addressed this issue. The report stated: "Careers in sales are often overlooked by recent college graduates, but this field offers excellent opportunities for graduates with diverse backgrounds. ... Sales careers prejudices exist because of the old stereotype of the fast-talking backslapping salesperson. Opportunities for high earnings and potential advancement may be greater in some sales positions than in most other occupations".11/

The sales occupations offer numerous job opportunities for people with diverse backgrounds and job goals.

7. Clerical Occupations

Clerical occupations comprise one of the largest occupational groups in the state. In a group as large as this we find certain occupations will dominate the actual number of jobs, but also have low vacancy rates due to their large employment bases. It is important to make this distinction as we analyze these jobs in terms of their rank by vacancy rate.

SOC	OCCUPATIONS	EMPLOYMENT	JOS OPENINGS	VACANCY RATE
4624	Data Typists	8,340	478	5.4
4682	Bank Tellers	12,740	502	3.8
4610	Secretaries & Stenographers	80,380	2,729	3.3
4622	Typists	31,075	786	2.5
4850	Computer & Peripheral Equipment Operators	5,691	124	2.1
4712	Bookkeepers, Accountants, & Auditing Clerks	41,203	790	1.9
4702	Other Clerical Occupations	275,716	3,588	1.3

10/ Occupational Outlook Handbook 1980-81, U.S. Department of Labor, Bureau of Labor Statistics, P. 115.

11/ "Employment Goals for the Liberal Arts Graduate and Undergraduate". Massachusetts Division of Employment Security, Occupation/Industry Research Department, P. 3-4.

In the clerical occupations we find the highest vacancy rate of 5.4 percent in the data typist category. This is one of the computer related occupational groups that has a mixed outlook. Among the occupations included in this group are keypunch operator, magnetic tape composer operator, terminal operator, and varitype operator. In recent years the demand for keypunch operators has been replaced by a need for direct data entry operators as technology develops new forms of inputting data on magnetic tapes and disks.

The bank teller occupation showed a vacancy rate of 3.8 percent, a measure of both replacement demand and expansion of bank services. Persons in this occupation often work part-time or consider it a temporary job on their way to careers in banking or other fields. Although the increased use of computerized equipment will speed the work process and eliminate some routine banking duties, the job demand for tellers should not be adversely affected.

The next clerical category is secretaries and stenographers with a vacancy rate of 3.3 percent and 2,729 estimated openings. In spite of the automation of many routine clerical jobs it is generally believed that the demand for secretaries will remain high because the position required public contact and organizational skills. The 3.3 percent rate is misleading because of the substantial employment base. Employment of stenographers is expected to decline because of the increased use of office dictation machines.

All other clerical occupations have vacancy rates that fall under the overall rate of 3.1 percent. Openings in the typist, bookkeeper, accounting, and auditing clerk, and "other clerical occupations" categories are expected to come about largely because of turnover. A number of these jobs will be eliminated as technology introduces machines to perform some of these functions. Computer operator positions are expected to decline as innovations in hardware result in smaller and easier to operate computers. While the all-encompassing group, "other clerical occupations", has a very small vacancy rate (1.3 percent), the large number of persons employed in these occupations (275,000) must be kept in mind.

B. Blue Collar Occupations

1. Machinery Occupations

In the production working occupations we find the highest vacancy rate in the survey, 13.3 percent, for the occupation of machinist. This is even more significant when you consider the fact that the next highest occupational category had a rate of only 7.8 percent. There are observations that can be made concerning whether this rate reflects the true need for machinists in Massachusetts.

It is interesting to compare the vacancy rates among the occupations involved with machinery. These are presented as follows:

SOC	OCCUPATION	EMPLOYMENT	JOS OPENINGS	VACANCY RATE
7213	Machinists	9,952	1,524	13.3%
7211	Tool & Die Makers	4,854	335	6.4%
7502	Machine Operators	176,825	4,484	2.5%

In looking at this table we see a wide disparity among the rates for these related occupations. The machinist vacancy rate is 5 times as high as the machine operator. There are two possible explanations for this: (1) employers in filling out the survey have differed with the survey definitions and put machine operator openings in the category of machinist thus overstating the vacancy rate for machinist; or (2), the occupation of machinist is a highly skilled occupation for which there is a critical need in this state.

There is evidence the occupations of machinist and machine operator as defined by the JOS survey could differ from employer definitions of those occupations. The essential difference between machinist and machine operator as defined by the JOS survey is that the machinist can set up and adapt a machine to specific types of precise operations, while a machine operator would be involved in tending and operating a machine already set-up to do a specific task. It is the ability to change and modify a machine's function which separates a machinist from a machine operator.

There is little doubt that a machinist by training may be utilized mainly as a machine operator, especially by larger manufacturing firms. Once machines are set-up they may produce the same high volume parts for years, and only require someone to tend to the operation of the machine. Although the employee is performing the work of a machine operator he is still referred to as a machinist by the employer. This problem of definition was encountered in a previous DES study. According to the report: "There were considerable differences in the definition of machinists from firm to firm in every labor market area. In the Pittsfield Labor Market area one personnel manager commented that the definition of a machinist in the Dictionary of Occupational Titles pertained more to an engineer than a machinist. In the Lawrence-Haverhill Labor Market area, the Lowell LMA, and the Springfield LMA, individuals with titles of machinists who worked in large firms frequently performed the task of a machine operator. The situation was complicated by the fact that graduates of vocational technical schools referred to themselves as machinists but were used by employers as machine operators".12/ There does seem to be some evidence to suggest that perhaps all the machinist openings are not for high-level, all-around machinists who usually set-up and adapt machines for different uses. They may in fact be more in

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12/ Labor Area Trends in Supply and Demand FY 1978-79, Boston SMSA, Massachusetts, Massachusetts Division of Employment Security, Labor Area Research Department, P. 4.

the machine operator category which could have led to an overstatement of the machinist vacancy rate. However, regardless of duties, most employers require a good vocational education, work experience, or both for their machinist openings.

Although we have made a case for an overstatement of the vacancy rate for machinists, there can be little doubt that the true vacancy rate for this occupation is very high. Along with a high vacancy rate we also find that 56 percent of the openings were unfilled a month or longer. This ranks 4th highest out of the forty occupations studied and is a definite indication of employer difficulty in filling these positions.

Most machinist openings arise not from growth, but rather from replacement demand due to retirements, deaths, or transfers to other companies or fields of work.13/ In conducting field interviews during the survey we discovered that the smaller machine shops had a very difficult time competing with larger firms in hiring and keeping good machinists. This was due mainly to the fact that their wages and benefits were lower than the larger firms. Some of them were particularly distressed over the fact that they would train someone to be a machinist, only to have them leave for better wages once they had acquired the skill. The problem was also found in a previously mentioned DES report. The report stated: "In an SMSA in the Southeastern Region of the State, employers discussed efforts at "pirating" from other firms. Efforts ranged from placing a recruiter in a tavern across the street from a machine shop, to going through town residency lists to identify machinists".14/ The situation of shops competing among themselves for the available talent, and the fact that some firms unwittingly served as training institutions for other firms are indications of supply not meeting demand in the occupation of machinist. We should note here that the 6.4 percent rate for the highly skilled tool and die makers does go along to a certain degree with the high demand for all-around machinists in the state. Also, despite the low vacancy rate for machine operators, this group recorded the highest number of openings among the 40 occupational categories. From the results of the survey we could say the machining occupations would be a fruitful ground for manpower and educational planners to channel training funds.

2. Other Production Working Occupations

Two other production working occupations which deserve attention because of fairly high vacancy rates are welders and cutters, and assemblers. The welders and cutters category recorded a vacancy rate of 4.1 percent. As with machinists there is a high replacement demand for welders who retire, die, or transfer to other firms or occupations.

13/ Occupational Outlook Handbook 1980-81, U. S. Department of Labor, Bureau of Labor Statistics, P. 35.

14/ Labor Area Trends in Supply and Demand, FY 1978-79, Boston SMSA, Massachusetts, Massachusetts Division of Employment Security, Labor Area Research Department, P. 6.

The 4.2 percent vacancy rate for assemblers can be tied in with the growth of high technology firms in Massachusetts. There is a need to assemble the electronic components produced by high technology firms.

3. Mechanics and Repairers

The category "other mechanics and repairers" had a vacancy rate of 4.3 percent and 1,441 openings. The group does not include automobile mechanics and telephone line installers and repairers. A breakdown of employment by industry for mechanics and repairers might prove helpful in looking at this group of occupations. According to the Bureau of Labor Statistics almost one-fourth of the mechanics and repairers worked in manufacturing industries--the majority in plants that produce durable goods such as steel, automobiles, and aircraft. About one-fifth worked in retail trade--mainly in firms that sell and service automobiles, household appliances, farm implements, and other mechanical equipment. Another one-fifth worked in shops that service such equipment. Most of the remaining mechanics and repairers worked for transportation, construction, and public utilities industries, and all levels of government.15/

The vacancy rate of 4.3 percent does indicate a fair demand for the mechanics and repairers who would be included under the broad category we are dealing with in the JOS survey. Occupational projections published by the DES can give us an indication as to what specific areas the demand for mechanics and repairers is concentrated. The publication stated that: "Within the mechanic and repairer group, new employment opportunities will abound for air conditioning and refrigeration mechanics, data processing machine repairers and office machine repairers".16/ These occupations would all be included under the category "other mechanics and repairers".

C. Service Occupations

The service occupations involving the preparation and serving of food had the highest vacancy rates of 5.4 percent and 3.8 respectively.

SOC	OCCUPATION	EMPLOYMENT	JOS OPENINGS	VACANCY RATE
5214	Cooks	22,874	1,318	5.4
5213	Waiters & Waitresses	50,019	2,002	3.8
5202	Other Service Occupations, Except Private Household	122,290	2,715	2.2
5240	Cleaning & Building Service Occupations	68,967	1,084	1.5

15/ Occupational Outlook Handbook, 1980-81, U. S. Department of Labor, Bureau of Labor Statistics, P. 32.

16/ Employment Requirement by Occupation, by Industry, 1976-1985, Massachusetts Division of Employment Security, Occupation/Industry Research Department, P. 27.

These occupations are expected to be in demand through the 1980's as personal income and leisure time rises, allowing more money to be spent on food and beverages outside the home. The labor pool for these occupations is large because of low educational and experience requirements. This is counterbalanced, however, by high turnover due to the fact that these jobs may be relatively low paying, offer little career advancement, often require working nights and weekends, and are frequently filled by individuals such as students who only consider it a temporary job. Many of these positions are part-time as indicated by the fact that 81 percent of the waiter and waitress positions in the JOS survey were estimated to be part-time. Two other occupational categories can be included in our analysis of service occupations. These are "other service occupations except private household", and cleaning and building service occupations. Although the vacancy rate for the former is 2.2 percent, and the latter 1.5 percent, the two combined have an estimated 3,799 openings due to the large number of people employed in these occupations. The high number of service occupations reflects the need for services in our society and the people to provide them.

TABLE 1
JOS OPENINGS IN MAJOR AND SELECTED OCCUPATIONAL GROUPS
1979

SOC	OCCUPATIONAL GROUPS	1/ EMPLOYMENT	JOS 2/ OPENINGS	VACANCY RATE	RELATIVE STANDARD ERROR
	TOTAL	2,159,271	68,391	3.1	.08
	EXECUTIVE, ADMINISTRATIVE & MANAGERIAL	224,818	3,302	1.5	.30
1412	Accountants & Auditors	21,658	669	1.1	.22
1102	Other Executive , Administrative, & Managerial Occupations	203,162	2,353	1.3	.36
	ENGINEERS, ARCHITECTS & SURVEYORS	54,370	2,281	4.0	.11
1633	Electrical & Electronic Engineers	17,620	1,025	5.5	.19
1635	Mechanical Engineers	8,760	662	7.0	.12
1602	Other Engineers & Architiects	22,550	562	2.4	.12
1628	Civil Engineers	5,440	33	0.6	.27
	NATURAL SCIENTISTS & MATHEMATICIANS	16,800	1,047	5.9	.20
1700	Computer, Mathematical & Operations Research Occupations	8,520	711	7.7	.13
1800	Natural Scientists	8,280	335	3.8	.46
	SOCIAL SCIENTISTS, SOCIAL WORKERS, RELIGIOUS WORKERS & LAWYERS 3/	--	--	--	--
1900	Social Scientists & urban planners	4,378	63	1.4	.40
	TEACHERS, LIBRARIANS & COUNSELORS 3/	--	--	--	--
	HEALTH DIAGNOSING & TREATING PRACTIONERS 3/	--	--	--	--
	REGISTERED NURSES, PHARMACISTS, DIETICIANS & PHYSICIAN'S ASSISTANTS	51,591	2,531	4.7	.21
2900	Registered Nurses	42,954	2,192	4.9	.21
3000	Pharmacists, Dieticians, Therapists, & Physician's Assistants	8,637	340	7.8	.42
3202	WRITERS, EDITORS, ARTISTS, ENTERTAINERS, & ATHLETES	16,213	512	3.0	.36
	HEALTH TECHNOLOGISTS & TECHNICIANS	40,365	1,625	3.9	.24
3660	Licensed Practical Nurses	17,277	1,213	6.6	.33
3602	Other Health Technologists & Technicians	23,088	412	1.7	.26
	TECHNOLOGISTS & TECHNICIANS, EXCEPT HEALTH	55,710	2,866	4.9	.32
3930	Programmers	9,880	688	6.5	.31
3902	Other Technologists & Technicians	45,830	2,178	4.5	.40
	MARKETING & SALES OCCUPATIONS	160,621	4,837	2.9	.25
4100	Sales Occupations, Commodities	135,730	3,409	2.4	.36
4302	Other Marketing & Sales Occupations	14,753	322	2.1	.38
	CLERICAL OCCUPATIONS	523,777	11,263	2.1	.19
4610	Secretaries & Stenographers	80,380	2,729	3.3	.27
4622	Typists	31,075	786	2.5	.22
4624	Data Typists	8,340	478	5.4	.27
4682	Bank Tellers	12,740	502	3.8	.40
4712	Bookkeepers & Accounting & Auditing Clerks	41,203	790	1.9	.34
4702	Other Clerical Occupations	275,716	3,588	1.3	.21
4850	Computing & Peripheral Equipment Operators	5,691	124	2.1	.26

TABLE 1 (cont.)
JOS OPENINGS IN MAJOR AND SELECTED OCCUPATIONAL GROUPS
1979

SOC	OCCUPATIONAL GROUPS	1/ EMPLOYMENT	JOS 2/ OPENINGS	VACANCY RATE	RELATIVE STANDARD ERROR
	SERVICE OCCUPATIONS	378,853	10,772	2.8	.18
5213	Waiters & Waitresses	50,019	2,002	3.8	.45
5214	Cooks	22,874	1,318	5.4	.37
5236	Nurses Aides, Orderlies, & Attendants	39,745	2,625	6.2	.35
5240	Cleaning & Building Service Occupations	68,967	1,084	1.5	.32
5202	Other Service Occupations, Except Private Households	122,290	2,715	2.2	.40
	AGRICULTURAL & FORESTRY OCCUPATIONS 3/	--	--	--	--
	CONSTRUCTION OCCUPATIONS 3/	--	--	--	--
	TRANSPORTATION & MATERIAL MOVING OCCUPATIONS	75,133	2,154	2.8	.41
6412	Truck Drivers	30,012	293	0.9	.48
	MECHANICS & REPAIRERS	57,305	2,931	4.9	.41
6702	Other Mechanics & Repairers	32,069	1,441	4.3	.43
	PRODUCTION WORKING OCCUPATIONS	444,958	12,102	2.7	.14
7211	Tool & Die Makers	4,854	335	6.4	.44
7213	Machinists	9,952	1,524	13.3	.23
7502	Machine Operators & Tenders	176,825	4,484	2.5	.25
7714	Welders & Cutters	6,783	294	4.1	.25
7720	Assemblers	51,924	2,295	4.2	.17
7800	Production Inspectors, Testers, Samplers, & Weighers	19,794	426	2.1	.35
7902	Other Production Working Occupations	174,826	2,726	1.5	.32
	MATERIAL HANDLERS, EQUIPMENT CLEANERS & LABORERS	121,519	3,343	2.7	.25
8402	Freight, Stock & Material Hand Movers; Vehicle Washers & Equipment Cleaners	116,975	2,761	2.3	.18

1/ Occupational employment includes employment in government and agriculture while JOS openings do not.

2/ JOS openings are an average of the number of openings on the last day of the months of March, June, and September 1979.

3/ Relative Standard Error above accepted criteria

TABLE 2
JOB OPENINGS SURVEY ESTIMATES
OCCUPATIONAL GROUPS RANKED BY VACANCY RATE
1979

SOC	OCCUPATION	EMPLOYMENT 1/	JOS OPENINGS 2/	VACANCY RATE
7213	Machinists	9,952	1,524	13.3
3000	Pharmacists, Dieticians, Therapists & Physician's Assistants	8,637	340	7.8
1700	Computer, Mathematical, and Operations Research Occupations	8,520	711	7.7
1635	Mechanical Engineer	8,760	662	7.0
3660	Licensed Practical Nurse	17,277	1,213	6.6
3930	Programmer	9,880	688	6.5
7211	Tool & Die Makers	4,854	335	6.4
5236	Nurses Aides, Orderlies & Attendants	39,745	2,625	6.2
1633	Electrical & Electronic Engineers	17,620	1,025	5.5
5214	Cooks	22,874	1,318	5.4
4624	Data Typists	8,340	478	5.4
2900	Registered Nurses	42,954	2,192	4.9
3902	Other Technologists & Technicians, Except Health	45,830	2,178	4.5
6702	Other Mechanics & Repairers, Except Auto	32,069	1,441	4.3
7720	Assemblers	51,924	2,295	4.2
7714	Welders & Cutters	6,783	294	4.1
5213	Waiters & Waitresses	50,019	2,002	3.8
4682	Bank Tellers	12,740	502	3.8
1800	Natural Scientists	8,280	335	3.8
4610	Secretaries & Stenographers	80,380	2,729	3.3
3202	Writers, Editors, Artists, Entertainers & Athletes	16,213	512	3.0
1412	Accountants & Auditors	21,656	669	3.0
4622	Typists	31,075	786	2.5
7502	Machine Operators & Tenders	176,825	4,484	2.5
4100	Sales Occupations, Commodities	135,730	3,409	2.4
1602	Other Engineers & Architects	22,550	562	2.4
8402	Freight, Stock, & Material Movers; Vehicle Washers & Equip. Cleaners	116,957	2,761	2.3
5202	Other Service Occupations, Except Private Household	122,290	2,715	2.2
4850	Computers & Office Equipment Operators	5,691	124	2.1
7800	Production Inspectors, Testers, Samplers & Weighers	19,794	426	2.1
4302	Other Marketing & Sales Occupations	14,753	322	2.1
4712	Bookkeepers, Accountants, & Auditing Clerks	41,203	790	1.9
3602	Other Health Technologists	23,088	412	1.7

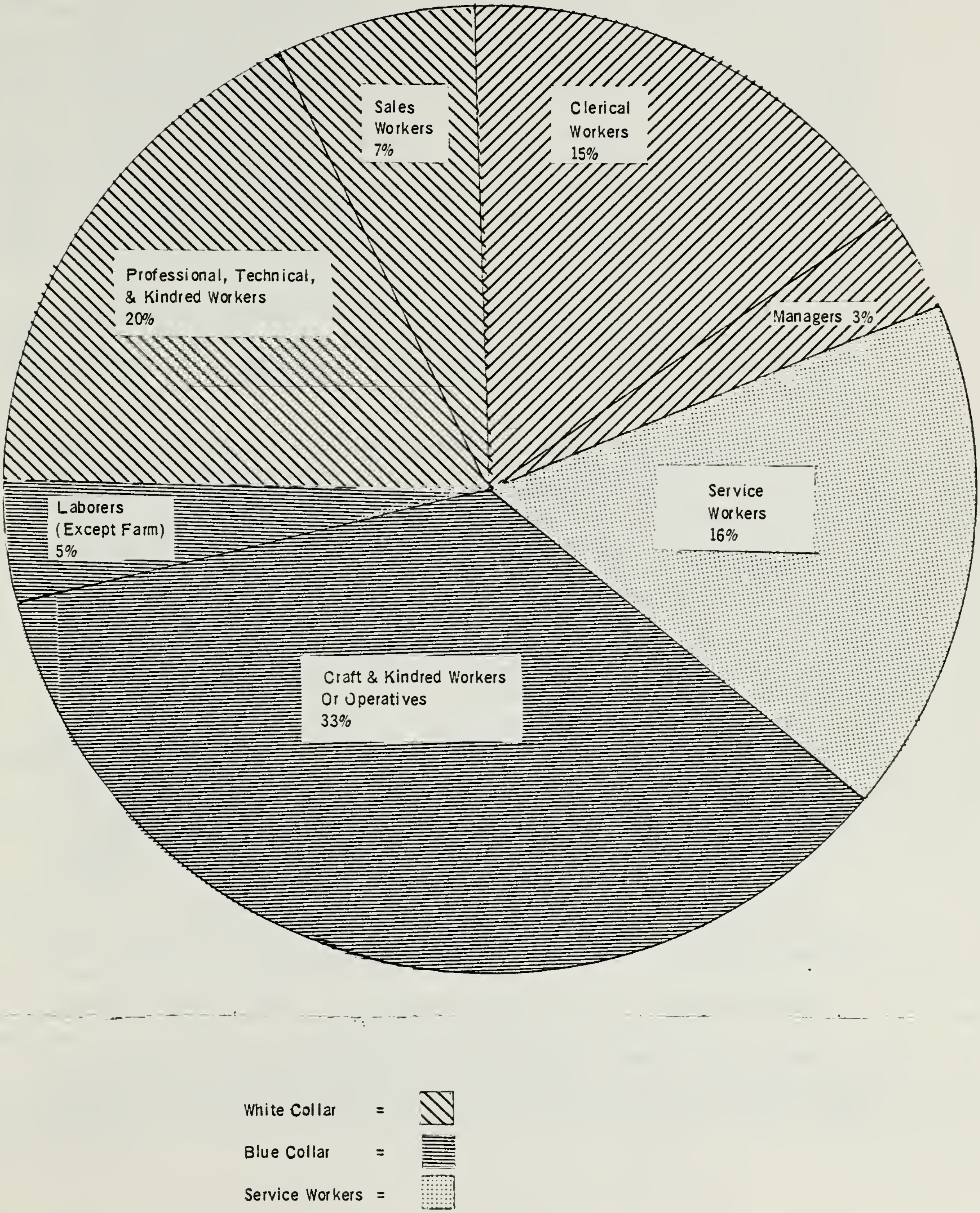
TABLE 2 (cont.)
JOB OPENINGS SURVEY ESTIMATES
OCCUPATIONAL GROUPS RANKED BY VACANCY RATE
1979

SOC	OCCUPATION	EMPLOYMENT[1]	JOS OPENINGS[2]	VACANCY RATE
7902	Other Production Working Occupations	174,826	2,742	1.5
5240	Cleaning & Building Service Occupations	68,967	1,084	1.5
1900	Social Scientists & Urban Planners	4,378	63	1.4
4702	Other Clerical Occupations	275,716	3,588	1.3
1102	Other Executive, Administrative & Managerial Occupations	203,162	2,353	1.1
6412	Truck Drivers	30,012	293	0.9
1628	Civil Engineers	5,440	33	0.6

[1] Occupational employment includes employment in government and agriculture while JOS openings do not.

[2] JOS openings are an average of the number of openings on the last day of the months of March, June, and September 1979.

TABLE 3
PERCENTAGE OF JOS OPENINGS BY MAJOR OCCUPATIONAL GROUP
1979 [1/]



[1/] JOS openings are an average of the number of openings on the last day of the months of March, June and September 1979.

III Comparisons of JOS and Projections Openings

Openings from the JOS survey cannot be compared directly with projected average annual job openings from the DES publication "Employment Requirements by Occupation, by Industry 1976-1985". JOS openings represent the number of openings existing at a point in time. Job openings less than one month old from the three JOS surveys averaged 48,510. This figure represents the average of all openings available on the last day of the three months (March, June and September) that had become available sometime during each of those months. Multiplying this figure by twelve (582,120) would give an estimate of total job openings of less than one month's duration, available during 1979. It does not, however, include the many job openings that are available during each month but are either filled or removed prior to the end of the month. Still, the figure of 582,116 alone, contrasts sharply with the projected average annual job openings figure of 142,370. The disparity would appear even greater if one realizes that the projections also include openings within government and agriculture and for the self employed. There are, however, logical explanations as to why JOS openings are so much greater than those of the projections.

1. The JOS is a measure of actual current job openings while the projections do not actually estimate openings but estimate positions that are projected to be filled on an annual average basis.

2. The projections measure labor demand due to growth and labor force separations. The labor force separations include death, retirement and separations due to pregnancy and child caring. It does not measure quits or discharges since these people remain in the labor force and are expected to be reemployed shortly, usually in the same occupation. On the other hand, the JOS measures job openings no matter how they might come about. For example, a position in a fast food restaurant may turnover six times during a particular year. This would constitute six JOS openings but no projections openings.

3. The projections do not measure occupational mobility. Since many high and mid-level jobs are filled through either internal promotion or recruitment from other firms, there is a void created in the vacated lower level position which is not measured by the projections. For example, the retirement of a manager in a large company may result in the promotion of four different individuals along the career ladder (either internally or externally recruited or a combination of the two). The projections would just estimate one opening for a manager while the JOS would count all four openings.

Despite these areas of noncomparability, it is still helpful to look at the JOS and projections in terms of percentage composition of job openings. The comparison between percentage of JOS openings and percentage of projected demand openings by occupation can be divided into groups of relative comparability. This will be done in terms of the ratio between $\frac{\text{\% of JOS openings}}{\text{\% of projected demand}}$

Percentage of Jos Openings Significantly Higher
than Percentage of Projected Demand

SOC	OCCUPATION	% OF JOS OPENINGS	% OF PROJECTED DEMAND
7213	Machinist	2.2	0.5
4624	Data Typist	0.7	0.2
1700	Computer, Mathematical Operations Research	1.0	0.3
3930	Programmers	1.0	0.3
1635	Mechanical Engineers	1.0	0.3
5236	Nurses Aides, Orderlies, & Attendants	3.8	1.4
7211	Tool & Die Makers	0.5	0.2
1800	Natural Scientists	0.5	0.2
1633	Electrical Engineers	1.5	0.6
4682	Bank Tellers	0.7	0.3
3902	Other Technologists & Technicians, Except Health	3.2	1.4
5213	Waiters & Waitresses	2.9	1.5
7720	Assemblers	3.4	2.0
2900	Registered Nurses	3.2	1.9
8402	Freight Stock Material Movers	4.0	2.4
5214	Cooks	1.9	1.2

Generally speaking, the above occupations show a relatively greater demand on the 1979 JOS survey than on the occupational projections through 1985. Among professional and skilled occupations such as mechanical and electrical engineers; computer, mathematical, and operations research; programmers; technicians and technologists except health; registered nurses; and machinists there are a number of plausible explanations for the discrepancy. One reason would be a current structural employment problem that may be resolved in the years ahead. As people are trained for these occupations, and if professionals can be induced to relocate to Massachusetts, the percentage of openings in coming years may level off to long-term projected annual demand. A second likely explanation would be an understatement of the magnitude of projected growth in the occupational categories. Finally, and perhaps most importantly, the occupational mobility among many professional and technical jobs will likely result in a significantly greater percentage of current JOS openings than projected demand.

The largest discrepancy existed in the occupation of machinist. While the magnitude of the current demand is extraordinary, the previously mentioned phenomenon of small machine shops losing their machinists to the larger shops would not manifest itself in the projections.

In semi-skilled and unskilled occupations the greater percentage of openings in the JOS could be explained in terms of turnover. The rationale being that the JOS includes openings due to quits and discharges while the projections do not include these in its estimates. Jobs such as nurses aides; orderlies, and attendants; bank tellers; waiters and waitresses; cooks; assemblers; freight, stock and material hand movers; vehicle washers, equipment cleaners, and miscellaneous manual occupations are occupations where turnover could result in a significant portion of job openings. This would be reflected in the higher percentage of openings for these occupations in the JOS estimates

Percentage of JOS Openings Comparable to
Percentage of Projected Demand

SOC	OCCUPATION	% OF JOS OPENINGS	% OF PROJECTED DEMAND
7714	Welders & Cutters	0.4	0.3
3660	Licensed Practical Nurses	1.8	1.4
6702	Other Mechanics & Repairers	2.1	1.7
7502	Machine Operators & Tenders	6.6	6.3
5202	Other Service Occupations, Except Private Household	4.0	4.0
1602	Other Engineers & Architects	0.8	0.8
3000	Pharmacists, Dieticians, Therapists, & Physician's Assistants	0.5	0.5
4850	Computer & Peripheral Equipment Operator	0.2	0.2
4622	Typists	1.2	1.3
1412	Accountants & Auditors	1.0	1.1
4100	Sales Occupations (Commodities)	5.0	5.7
7902	Other Production Working Occupations	4.0	4.6
3602	Other Health Technologists & Technicians	0.6	0.8
3202	Writers, Editors, Artists, Athletes, & Entertainers	0.8	1.1
4712	Bookkeepers, Accounting & Auditing Clerks	1.5	2.1
4302	Other Marketing & Sales	0.5	0.8
6412	Truck Drivers	0.4	0.7
1900	Social Scientists & Urban Planners	0.1	0.2
1628	Civil Engineers	0.1	0.2

The above table is provided to show the JOS occupations which come closest to matching percentage of projected demand openings.

Percentage of JOS Openings Significantly Lower than Percentage of Projected Demand

SOC	OCCUPATION	% OF JOS OPENINGS	% OF PROJECTED DEMAND
4610	Secretaries & Stenographers	4.0	6.4
4702	Other Clerical Occupations	5.2	10.2
7800	Production Inspectors, Samplers, & Weighers	0.6	1.4
5204	Cleaning & Building Service Occupations	1.6	4.0
1102	Other Executive, Administrative & Managerial Occupations	3.4	11.8

This small groups of occupations were found to have a much larger share of job openings in the projected demand estimates than in the JOS estimates. A lack of coverage in the government sector by the JOS survey could explain part of this discrepancy. With the exception of production inspectors, samplers, and weighers, the above occupations are well represented in the government workforce. Three of the occupations are in the white collar category: "other executive, administrative, and managerial occupations"; secretaries and stenographers; and "other clerical occupations". The cleaning and building service occupations are also well represented in the government sector. They maintain the many Federal, State, County, and Municipal buildings in the Commonwealth. In not including government in the JOS survey it is probable that these occupations had job openings estimates that fell short of the actual demand. In the case of the "other executive, administrative, and managerial occupations", it is likely that the relatively low percentage of JOS openings was also the result of JOS openings being listed under other occupational categories. Secretarial and clerical positions are more likely to be filled from outside the labor force, thus leading to a relatively higher percentage of projected demand than would occur for positions where occupational mobility is significant. Finally, it is possible that the projections somewhat overstated demand in these occupational categories.

TABLE 4

DEMAND FOR WORKERS IN MAJOR OCCUPATIONAL CATEGORIES
JOS VS OCCUPATION/INDUSTRY PROJECTION PROGRAM
1979

OCCUPATIONAL CATEGORIES	JOS OPENINGS[1]	PERCENT OF TOTAL OPENINGS	PROJECTED ANNUAL AVERAGE DEMAND [2]	PERCENT OF PROJECTED DEMAND
TOTAL	68,391	100	142,370	100
WHITE COLLAR	31,925	46	79,750	56
Professional, Technical, Kindred	13,472	20	20,470	14
Managers	2,353	3	16,490	12
Sales Workers	4,837	7	10,400	7
Clerical Workers	11,263	16	32,390	23
BLUE COLLAR	25,137	37	37,040	26
Craft & Kindred Workers & Operatives	21,794	32	33,040	23
Laborers	3,343	5	4,000	3
SERVICE WORKERS	10,772	16	24,910	18
AGRICULTURAL WORKERS [3]	147	--	630	--
UNCLASSIFIED	410	1	--	--

1/ JOS openings are an average of the number of openings on the last day of the months of March, June, and September 1979.

2/ Refer to publication "Employment Requirements by Occupation, by Industry 1976-1985". Projected openings include openings in government and agriculture and for the self-employed.

3/ JOS openings do not include openings in agricultural industries.

TABLE 5
A COMPARISON OF OCCUPATIONAL DEMAND FOR WORKERS FROM THE JOS AND THE OCCUPATION/INDUSTRY PROJECTION PROGRAM
1979

SOC	OCCUPATIONS	JOS OPENINGS1/	PERCENT OF TOTAL OPENINGS	RANK	PROJECTED ANNUAL AVERAGE DEMAND2/	PERCENT OF PROJECTED DEMAND	RANK
7502	Machine Operators & Tenders	4,484	6.6	1	9,020	6.3	4
4702	Other Clerical Occupations	3,588	5.2	2	14,460	10.2	2
4100	Sales Occupations & Commodities	3,409	5.0	3	8,150	5.7	5
8402	Freight, Stock & Material Hand Movers; Vehicle Washers & Equip. Cleaners	2,761	4.0	4	3,360	2.4	8
7902	Other Production Working Occupations	2,742	4.0	5	6,510	4.6	6
4610	Secretaries & Stenographers	2,729	4.0	6	9,050	6.4	3
5202	Other Service Occupations, Except Private Household	2,715	4.0	7	5,730	4.0	7
5236	Health Service Occupations, Nursing Aides, Orderlies, & Attendants	2,625	3.8	8	1,930	1.4	15
1102	Other Executive, Administrative, & Managerial Occupations	2,353	3.4	9	16,860	11.8	1
7720	Assemblers	2,295	3.4	10	2,870	2.0	10
2900	Registered Nurses	2,192	3.2	11	2,640	1.9	11
3902	Other Technologists & Technicians, Except Health	2,178	3.2	12	1,940	1.4	15
5213	Waiters & Waitresses	2,002	2.9	13	2,170	1.5	13
7213	Machinists	1,524	2.2	14	760	0.5	25
6702	Other Mechanics & Repairers	1,441	2.1	15	2,400	1.7	12
5214	Cooks	1,318	1.9	16	1,760	1.2	17
3660	Licensed Practical Nurses	1,213	1.8	17	1,940	1.4	15
5240	Cleaning & Building Service Occupations	1,084	1.6	18	5,730	4.0	7

TABLE 5 (cont.)
A COMPARISON OF OCCUPATIONAL DEMAND FOR WORKERS FROM THE JOS AND THE OCCUPATION/INDUSTRY PROJECTION PROGRAM
1979

SOC	OCCUPATIONS	JOS OPENINGS[1/]	PERCENT OF TOTAL OPENINGS	RANK	PROJECTED ANNUAL AVERAGE DEMAND[2/]	PERCENT OF PROJECTED DEMAND	RANK
1633	Electrical & Electronic Engineers	1,025	1.5	19	840	0.6	24
4712	Bookkeepers & Accounting & Auditing Clerks	790	1.5	20	2,950	2.1	9
4622	Typists	786	1.2	21	1,890	1.3	16
1700	Computer, Mathematical, & Operations Research Occupations	711	1.0	22	360	0.3	31
3930	Programmers	688	1.0	23	370	0.3	30
1412	Accountants & Auditors	669	1.0	24	1,520	1.1	19
1635	Mechanical Engineers	662	1.0	25	390	0.3	29
1602	Other Engineers & Architects	562	0.8	26	1,140	0.8	21
3202	Writers, Editors, Artists, Entertainers, & Athletes	512	0.8	27	1,630	1.1	18
4682	Bank Tellers	502	0.7	28	460	0.3	27
4624	Data Typists	478	0.7	29	220	0.2	37
7800	Production Inspectors, Testers, Samplers, & Weighers	426	0.6	30	1,970	1.4	14
3602	Other Health Technologists & Technicians	412	0.6	31	1,200	0.8	20
3000	Pharmacists, Dietitians, Therapists & Physician's Assistants	340	0.5	32	730	0.5	26
1800	Natural Scientists	335	0.5	33	330	0.2	33
7211	Tool & Die Makers	335	0.5	34	340	0.2	32
4302	Other Marketing & Sales Occupations	322	0.5	35	1,110	0.8	22
7714	Welders & Cutters	294	0.4	36	440	0.3	28
6412	Truck Drivers	293	0.4	37	1,020	0.7	23
4850	Computing & Office Equip. Operators, Computer & Peripheral Equip. Oper.	124	0.2	38	230	0.2	36
1900	Social Scientists & Urban Planners	63	0.1	39	290	0.2	34
1628	Civil Engineers	33	0.1	40	270	0.2	35

1/ JOS openings are an average of the number of openings on the last day of the months of March, June, and September 1979.

2/ Refer to publication "Employment Requirements by Occupation, by Industry 1976-1985". Projected openings include openings in government and agriculture and for the self-employed.

IV Comparison of Employment and Openings by Occupation

The purpose of this section is to view the occupational groups in terms of the relationship between percentage of total employment and percentage of total JOS openings. In this analysis we are assuming that there is a direct relationship between the two variables. Consequently, an occupation with a large number of employed persons would be expected to have a large number of job openings and vice versa.

The demand in an occupation may be measured by the relationship between employment and openings. An occupation with a significantly higher percentage of total job openings than its percentage of total employment has a disproportionate share of job openings relative to its size. Within the Job Openings Survey those occupations exhibiting this relationship should be analyzed to find the reasons for this imbalance. Presented below is a sub-table of occupations showing a significant imbalance between percentage of total job openings and percentage of total employment. Many of these occupations have already been discussed in an earlier section of the report covering analysis of data by occupations.

SOC	OCCUPATION	% OF JOS OPENINGS	% OF TOTAL EMPLOYMENT
7213	Machinists	2.23	0.50
1700	Computer, Mathematical & Operations Research	1.04	0.40
1635	Mechanical Engineers	0.97	0.40
3660	Licensed Practical Nurses	1.77	0.80
5236	Nurses Aides, Orderlies, & Attendants	3.84	1.80
3920	Programmers	1.01	0.50
1633	Electrical & Electronic Engineers	1.50	0.80
5214	Cooks	1.93	1.10
2900	Registered Nurses	3.21	2.00
3902	Other Technologists & Technicians, Except Health	3.18	2.10
7720	Assemblers	3.36	2.40

As the reader can see there are few surprises among the occupations listed in the above table, thus giving further emphasis to the fact that these occupations are in high demand in Massachusetts It is interesting to note that five of the occupations play key roles in the state's high technology industries. These are computer, mathematical, and operations research occupations; mechanical engineers; programmers; electrical and electronic engineers; and other technologists and technicians except health. The growth of high technology employment in Massachusetts has prompted an even faster rate of growth in job openings, resulting in an imbalance between openings and employment in these occupations. In the coming years increased emphasis on training and recruitment in these occupations will result in higher employment in these fields and possibly fewer job openings.

TABLE 6
A COMPARISON OF JOS OPENINGS AND EMPLOYMENT BY OCCUPATIONAL GROUPS
1979

SOC	OCCUPATIONS	EMPLOYMENT[1/]	PERCENTAGE OF TOTAL EMPLOYMENT	JOS OPENINGS[2/]	PERCENTAGE OF TOTAL JOS OPENINGS
7502	Machine Operators & Tenders	176,825	8.20	4,484	6.56
4702	Other Clerical Occupations	275,716	12.80	3,588	5.25
4100	Sales Occupations, Commodities	135,730	6.30	3,409	4.98
8402	Freight, Stock, & Material Hand Movers; Vehicle Washers, & Equipment Cleaners	116,957	5.40	2,761	4.04
7902	Other Production Working Occupations	174,826	8.10	2,742	4.01
4610	Secretaries & Stenographers	80,380	3.70	2,729	3.99
5202	Other Service Occupations Except Private Household	122,290	5.70	2,715	3.97
5236	Nurses Aides, Orderlies, & Attendants	39,745	1.80	2,625	3.84
1102	Other Executive, Administrative, & Managerial Occupations	203,162	9.40	2,353	3.44
7720	Assemblers	51,924	2.40	2,295	3.36
2900	Registered Nurses	42,954	2.00	2,192	3.21
3902	Other Technologists & Technicians	45,830	2.10	2,178	3.18
5213	Waiters & Waitresses	50,019	2.30	2,002	2.93
7213	Machinists	9,952	0.50	1,524	2.23
6702	Other Mechanics & Repairers, except Auto	32,069	1.50	1,441	2.11
5214	Cooks	22,874	1.10	1,318	1.93
3660	Licensed Practical Nurses	17,277	0.80	1,213	1.77
5240	Cleaning & Building Service Occupations	68,967	3.20	1,084	1.59
1633	Electrical & Electronic Engineers	17,620	0.80	1,025	1.50
4712	Bookkeepers, Accountants & Auditing Clerks	41,203	1.90	790	1.16
4622	Typists	31,075	1.40	786	1.15
1700	Computer, Mathematical, & Operating Research Occupations	8,520	0.40	711	1.04

TABLE 6 (cont.)
A COMPARISON OF JOS OPENINGS AND EMPLOYMENT BY OCCUPATIONAL GROUPS
1979

SOC	OCCUPATIONS	EMPLOYMENT 1/	PERCENTAGE OF TOTAL EMPLOYMENT	JOS OPENINGS 2/	PERCENTAGE OF TOTAL JOS OPENINGS
3920	Programmers	9,880	0.50	688	1.01
1412	Accountants & Auditors	21,656	1.00	669	0.98
1635	Mechanical Engineer	8,760	0.40	662	0.97
1602	Other Engineers & Architects	22,550	1.00	562	0.82
3202	Writers, Editors, Artists, Entertainers & Athletes	16,213	0.80	512	0.75
4682	Bank Tellers	12,740	0.60	502	0.73
4624	Data Typists	8,340	0.40	478	0.70
7800	Production Inspectors, Testers, Samplers & Weighers	19,794	0.90	426	0.62
3602	Other Health Technologists & Technicians	23,088	1.10	412	0.60
3000	Pharmacists, Dieticians, Therapists	8,637	0.40	340	0.50
1800	Natural Scientists	8,280	0.40	335	0.49
7211	Tool & Die Makers	4,854	0.20	335	0.49
4302	Other Marketing & Sales Occupations	14,753	0.70	322	0.47
7714	Welders & Cutters	6,783	0.30	294	0.43
6412	Truck Drivers	30,012	1.40	293	0.43
4850	Computing & Office Equipment Operators; Computer & Peripheral Equip. Operators	5,691	0.30	124	0.18
1900	Social Scientists & Urban Planners	4,378	0.20	63	0.09
1628	Civil Engineers	5,440	0.30	33	0.05

1/ Occupational employment includes employment in government and agriculture while JOS openings do not.

2/ JOS openings are an average of the number of openings on the last day of the months of March, June, and September 1979

V Openings Unfilled 30 Days or More

A subcategory of current openings on the JOS schedule were those openings which were unfilled a month or longer (30 percent). This time period was felt to be a good indication of jobs that were hard to fill. Of the 40 occupational categories we are studying in this report, 24 were found to have accepteble relative standard errors in their unfilled a month or longer estimates.

In analyzing the percent of month old openings to total openings, we should keep in mind the relationship between this figure and the job vacancy rate. This can be summarized as follows:

1. High vacancy rate and high percentage of openings unfilled a month or longer -- This situation would seem to indicate structural unemployment where there are not enough trained people to meet the existing demand. The employer would readily hire people in less than a month's time if they were available. The situation, however, could also suggest an unmet demand due to low wages or unattractive working conditions.

2. High vacancy rate and low percentage of openings unfilled a month or longer -- In this case we may be looking at the effect frictional unemployment has on the relationship of these two variables. Unskilled low paying jobs could be subject to high turnover as people rapidly become disatisfied with working conditions. These jobs may not be open long because of the size of the unskilled labor pool and the tendency of those in it to move from one job to another.

3. Low vacancy rate and high percentage of openings unfilled a month or longer -- In the professional, administrative, and technical categories this relationship may tell us that employers have little trouble finding applicants in certain occupations but are taking their time to find the best candidate for the job. The more responsibility a position has the more likely an employer will spend the time in searching for a quality person. Another possibility would be a lack of qualified applicants to fill these highly responsible positions. In terms of semi-skilled or unskilled work the relationship of a lower vacancy rate and a moderate to high percentage of opening unfilled a month or longer may indicate that the local labor pool is not quite able to meet the demand for these workers. This brings up the question of the geographic imbalance between available workers and job openings. Although local labor market job openings were not estimated, the open 30 days or more subcategory may measure, to some degree, the effect of a mismatch between local jobs and the available local labor force. As stated previously, this problem would be more acute for low paying semi and unskilled openings where the cost of commuting or actually moving to the area would not be considered worthwhile. This problem was brought up by a company in Woburn during a field visit. The personnel manager noted that because of the many industrial parks in the area the local unskilled labor pool was being taxed to the limit and consequently jobs were going unfilled. He said that he

knew of available workers in the Lawrence area and had recruited there but with little success. The problem is one of no available public transportation and the ever increasing cost of personal transportation. This situation may be partly responsible for the machine operator and tender occupational group having an above average percentage of its openings available a month or longer (32 percent).

4. Low vacancy rate and low percentage of openings unfilled a month or longer -- These two conditions suggest that the jobs that do become available are filled in a relatively short period of time.

In looking at the table we find that among the 12 occupations having the highest percentage of jobs open a month or longer eight had high vacancy rates. These occupations are computer programers; computer, mathematical and operations research occupations; electrical engineers; mechanical engineers; machinists; tool and die makers; registered nurses; and licensed practical nurses. These eight occupations had vacancy rates ranging from 4.9 percent to 13.3 percent and openings unfilled a month or longer ranging from 35 percent to 60 percent. As was previously suggested, this combination of high vacancy rates and high percent of openings unfilled a month or longer perhaps indicate a structural unemployment problem. In the case of machinists, tool and die makers, and nurses, a lack of geographic mobility could play a significant role. There is evidence here that supply simply does not meet the demand in these eight occupations and that they should be considered by government and industry for manpower training programs.

It is also interesting to note that among the top twelve occupations in terms of high percentage of month-old openings, nine of these are in the professional, technical, and kindred category, two in the crafts and kindred category, and one in the service category. In the bottom twelve we find five clerical occupations, three operatives occupations, two service occupations, one laborer occupation, and one professional, technical and kindred. From this information we can assume that the jobs most likely to have a high concentration of openings a month or longer are the professional and skilled occupations. These jobs may be open a month or longer because of lack of trained personnel, as we suggested in looking at the vacancy rates of the top twelve occupations, or because employers are taking longer to make a decision in filling these responsible positions.

TABLE 7
TOTAL JOS OPENINGS AND MONTH-OLD OPENINGS IN SELECTED OCCUPATIONAL GROUPS
1979

SOC	OCCUPATIONS	JOS OPENINGS 1/	OPENINGS UNFILLED A MONTH OR LONGER	PERCENT OF MONTH-OLD OPENINGS TO TOTAL OPENINGS
	TOTAL 2/	68,391	19,881	29
3930	Programmers	688	416	60
7213	Machinists	1,524	857	56
1602	Other Engineers & Architects	562	303	54
1633	Electrical & Electronic Engineers	1,025	514	50
1628	Civil Engineers	33	16	48
1635	Mechanical Engineers	662	312	47
1700	Computer, Mathematical, and Operations Research Occupations	711	313	44
7211	Tool & Die Makers	335	131	39
2900	Registered Nurses	2,192	860	39
3202	Writers, Editors, Artists, Entertainers & Athletes	512	186	36
3660	Licensed Practical Nurses	1,213	430	35
1102	Other Executive, Administrative & Managerial Occupations	2,353	812	34
7502	Machine Operators & Tenders	4,484	1,425	32
3602	Other Health Technologists	412	117	28
4622	Typists	786	209	26
5236	Nurses Aides, Orderlies & Attendants	2,625	630	24
7720	Assemblers	2,295	562	24
4624	Data Typists	478	113	24
4610	Secretaries & Stenographers	2,729	643	23
7902	Other Production Working Occupations	2,742	482	18
5213	Waiters & Waitresses	2,002	349	17
4702	Other Clerical Occupations	3,588	530	15
8402	Freight, Stock, & Material Movers; Vehicle Washers & Equipment Cleaners	2,761	384	14
4850	Computer & Office Equipment Operators	124	13	10

1/ Jos openings are the average of the number of openings on the last day of the months of March, June, and September 1979.

2/ Includes all occupational groups

VI Job Bank/JOS Job Openings

A comparison was made between average openings reported on the March, June, and September 1979 Job Openings Surveys and those listed with the DES Job Bank in September of 1979 17/ (See Table 8). Since the Job Bank employs the Dictionary of Occupational Titles (DOT) coding system and the Job Openings Survey utilizes the Standard Occupational Classification (SOC) system, a cross-walk between the two had to be constructed. While very few of the occupations will match exactly, there is a good measure of comparability for the majority of titles and occupational clusters included.

Earlier studies have estimated the coverage of Job Bank to be about 15 to 20 percent of all openings. Our findings approximate this contention; when Job Bank openings are calculated as a percentage of JOS openings the number approximates 14 percent. 18/ The Job Bank share of hard-to-fill JOS openings (defined as openings available 30 days or longer), however, is nearly twice as high (26.0 percent). For the occupational titles selected for analysis in this section of the report, the Job Bank share of JOS openings is somewhat higher (16.2 percent). 19/

A greater understanding of job openings in Massachusetts, at the more detailed levels of major occupational groups, occupational clusters, and individual occupational titles, may be attained by comparing the number and the characteristics of the openings received by the two sources.

Contrary to what one might expect, the Job Bank coverage of "other executive, administrative and managerial" openings was similar to that for all occupation (16.7 percent). However, the inclusion of government openings in the Job Bank figures and not in those of the JOS is a likely explanation for the Job Bank being this high.

Positions in technical fields such as engineering, operations research, health, and computer science are significantly underrepresented in the Job Bank. Our findings reveal that there are nearly twenty openings reported in the JOS, for every one listed with the Job Bank. Despite the great disparity in level of openings, both data sources confirm the contention that it is substantially harder to fill positions for engineers, computer analysts and programmers, technologists and technicians in all fields, registered nurses, dieticians and therapists (see Table 9). These results contribute support to the position that there is a shortage of people trained and/or possessing the necessary experience to meet the growing demand.

17/ The high number of public service employment (PSE) jobs listed on the March and June Job Banks precluded a valid comparison with the JOS.

18/ Openings in this context refer to the second line of Table 8, Total, All Occupations, which is total Job Bank openings minus those in public administration and agriculture, forestry and fisheries.

19/ This higher percentage is to be expected since individual occupational Job Bank openings include all government and agricultural openings.

In marked contrast to the apparent inability of the Job Bank to attract many openings in technical fields during this period, it does contain a greater relative share of the job openings available in the general economy for clerical, service and blue collar personnel. Roughly one out of every five JOS clerical openings is listed by an employer with a local Job Bank office (see Table 8). As clerical workers comprise the largest major occupational category in Massachusetts, access by the Job Bank to the openings in this sector of the market is most important. The most sizeable job growth for individual occupations in this category during the projection period 1976-1985 is anticipated to be among secretaries. Unfortunately, the Job Bank performance is much weaker in the secretarial groups, accounting for approximately one in ten openings.

It is further noted that the Job Bank consistently held a much greater percentage of hard-to-fill clerical openings, than did the JOS (see Table 9). A plausible explanation for this occurrence might be that the openings received by the Job Bank in this field are sometimes for positions that are considered undesirable due to low wages, inconvenient hours, or poor working conditions.

One might expect the Job Bank to contain a much higher percentage of hard-to-fill openings across all occupational categories than would be found in the general economy. A look at Table 9 confirms these expectations. Only the occupations accountant and auditor and natural scientist have a larger share of hard-to-fill openings on the JOS than on the Job Bank.

In addition to differences in magnitude there is substantial variation in the composition of hard-to-fill openings between the two sources. This dichotomy is disclosed by considering the percentage distribution of openings available 30 days or more within each of the data sources,by major occupational group.

	PERCENT DISTRIBUTION OF OPENINGS AVAILABLE 30 DAYS OR MORE	
MAJOR OCCUPATIONAL GROUP	JOB BANK	JOS
TOTAL, ALL OCCUPATIONS	100.0	100.0
White Collar Occupations	32.8	54.1
Professional, Technical, Managerial	12.2	35.2
Clerical & Sales	20.6	18.9
Blue Collar Occupations	48.6	33.1
Service Occupations	18.6	12.8

The most striking diverenge between the distributions occurs within the major occupational group, professional, technical, and managerial. The percentage share that JOS commands of hard-to-fill openings is nearly three times that of the Job Bank (35.2 percent and 12.2 percent respectively). Conversely, there is a disproportionately large representation of blue collar and service positions among the hard-to-fill openings listed with the Job Bank (67.2 percent of Job Bank and 45.9 percent of JOS). The conclusion can be drawn that many of the hard-to-fill openings listed with the Job Bank are available not because of a lack of skilled and qualified applicants but because the jobs are deemed less desirable.

TABLE 8
A COMPARISON OF JOS OPENINGS AND JOB BANK OPENINGS IN SELECTED OCCUPATIONAL GROUPS
1979 1/

SOC CODE	SELECTED OCCUPATIONS	JOS OPENINGS	JOB BANK OPENINGS	PERCENT OF JOB BANK TO JOS	JOS 30 DAYS OR MORE	JOB BANK 30 DAYS OR MORE	PERCENT OF JOB BANK 30 DAYS OR MORE TO JOS 30 DAYS OR MORE
TOTAL, ALL OCCUPATIONS 2/		68,391	11,455	16.7	19,881	6,048	30.4
TOTAL, ALL OCCUPATIONS 3/		68,391	9,773	14.3	19,881	5,165	26.0
TOTAL, SELECTED OCCUPATIONS 4/		45,806	7,431	16.2	14,063	4,023	28.6
EXECUTIVE, ADMINISTRATIVE, & MANAGERIAL OCCUPATIONS							
1412	Accountants & Auditors 5/	669	45	6.7	586	24	3.9
1102	Other Executive, Administrative, & Managerial Occupations 6/	2,353	393	16.7	812	220	27.1
PROFESSIONAL & TECHNICAL OCCUPATIONS							
1633,1635,1602	Engineers 7/	4,427	225	5.1	1,966	133	6.8
3902	Other Technologists & Technicians						
1700	Computer, Mathematical & Operations Research Occupations	1,399	30	2.1	679	21	3.1
3930	Programmers						
1800	Natural Scientists 8/	335	21	6.3	204	12	5.9
2900	Registered Nurses	2,192	69	3.2	860	49	5.7
3000	Pharmacists, Dieticians, Therapists, & Physician's Assistants	340	22	6.5	113	15	13.3
3202	Writers, Editors, Artists, Entertainers & Athletes	512	66	12.9	186	34	18.3
3660	Licensed Practical Nurses	4,424	359	8.1	1,187	244	20.6
3602	Other Health Technologists & Technicians						
9/ 5236	Nursing Aides, Orderlies, & Attendants						
5231	Other Health Service Occupations 10/						

TABLE 8 (cont.)
A COMPARISON OF JOS OPENINGS AND JOB BANK OPENINGS IN SELECTED OCCUPATIONAL GROUPS
1979 1/

SOC CODE	SELECTED OCCUPATIONS	JOS OPENINGS	JOB BANK OPENINGS	PERCENT OF JOB BANK TO JOS	JOS 30 DAYS OR MORE	JOB BANK 30 DAYS OR MORE	PERCENT OF JOB BANK 30 DAYS OR MORE TO JOS 30 DAYS OR MORE
CLERICAL OCCUPATIONS							
4610	Secretaries & Stenographers	2,729	259	9.5	643	128	19.9
4622	Typists	1,264	402	31.8	322	208	64.6
4624	Data Typists						
4712	Bookkeepers, Accounting & Auditing Clerks 11/	790	166	21.0	141	77	54.6
4850	Computer & Peripheral Equipment Operators	124	20	16.1	13	10	76.9
4702	Other Clerical Occupations	3,588	907	25.3	530	423	79.8
SERVICE OCCUPATIONS							
5240	Cleaning & Building Service Occupations	1,084	393	36.3	270	192	71.1
5213	Waiters & Waitresses	6,035	901	14.9	1,553	525	33.8
5214	Cooks						
5202	Other Service Occupations, Except Private Household						
MECHANICS & REPAIRERS PRODUCTION WORKING OCCUPATIONS							
6702	Other Mechanics & Repairers	13,541	3,152	23.3	3,998	1,708	42.7
7211	Tool & Die Makers						
7213	Machinists						
7502	Machine Operators & Tenders						
7714	Welders & Cutters						
7720	Assemblers						
7800	Production Inspectors, Testers, Samplers, & Weighers						
7902	Other Production Working Occupations						

TABLE 8 (cont.)

1/ JOS openings are an average of the number of openings on the last day of the months of March, June, and September 1979. Job Bank Openings pertain to the last day of September 1979.

2/ Job Bank openings data includes government and excludes agriculture. JOS data excludes both.

3/ To maintain comparability with JOS data, the Job Bank total openings and open 30 days or more figures have been adjusted to eliminate public administration. A small number of job openings for non-public administration government were not possible to exclude. If these figures had been eliminated, the percentage of job bank openings would be slightly lower.

4/ Job Bank openings data for all selected occupations includes government and excludes agriculture. JOS data excludes both.

5/ JOS data are only for March and June.

6/ Job Bank data includes openings for buyers whereas JOS data does not.

7/ Engineers included: electrical and electronic, mechanical, civil, chemical, aeronautical, industrial, mining and petroleum.

8/ Scientists included: chemists, physicists, geologists, agricultural scientists, biological scientists, and meteorologists.

9/ This grouping contains two professional occupational titles and two service occupational titles.

10/ Although the occupational title, Other Health Service Occupations, does not meet the designated selection criteria, it is included in a summary group with the other three occupational categories.

11/ Job Bank data includes openings for statistical clerks and bookkeeping machine operators but JOS data does not.

TABLE 9
MONTH-OLD JOB OPENINGS IN SELECTED OCCUPATIONAL GROUPS
JOS AND JOB BANK
BY PERCENT
1979

SELECTED OCCUPATIONS	PERCENT OF OPENINGS 30 DAYS OR MORE TO UNFILLED OPENINGS	
	JOB BANK 1/	JOS 2/
TOTAL, ALL OCCUPATIONS	52.8	29.1
TOTAL, SELECTED OCCUPATIONS	54.1	30.7
Accountants & Auditors	53.3	87.6
Other Executive, Administrative, & Managerial Occupations	56.0	34.5
Engineers	59.1	44.4
Other Technologists & Technicians		
Computer, Mathematical, & Operations Research Occupations	70.0	48.5
Programmers		
Natural Scientists	57.1	60.9
Registered Nurses	71.0	39.2
Pharmacists, Dieticians, Therapists & Physician's Assistants	68.2	33.2
Writers, Editors, Artists, Entertainers, & Athletes	51.5	36.3
Licensed Practical Nurses	68.0	26.8
Other Health Technologists & Technicians		
Nurses Aides, Orderlies, & Attendants		
Other Health Service Occupations		
Secretaries & Stenographers	49.4	23.6
Typists	51.7	25.5
Data Typists		
Bookkeepers, Accounting & Auditing Clerks	46.4	17.8
Computing & Office Equipment Operators	50.0	10.5
Other Clerical Occupations	46.6	14.8
Waiters & Waitresses	58.3	25.7
Cooks		
Other Service Occupations, Except Private Household		
Cleaning & Building Service Occupations	48.9	24.9
Other Mechanics & Repairers	54.2	29.5
Production Working Occupations		

1/ Job Bank openings pertain to the last day of September 1979. Percentages reflect openings in government. At the aggregate level, the percentage is virtually unchanged even if public administration is excluded.

2/ JOS openings are an average of the number of openings on the last day of the months of March, June, and September 1979. Percentages do not reflect openings in government.

VII Supply/Demand Considerations

The intent of this section of the report is to contribute to the research currently being conducted to develop a comprehensive occupational information system (OIS) in Massachusetts. An indication of the adequacy of labor supply to meet the demand for labor, arising both from growth and replacement, may be gained by considering the estimated number of individuals completing various training programs, the occupations of people registered with the Massachusetts Employment Service, and the skills, experience and educational background of the insured unemployed (see Table 10).

It is important before beginning our analysis to identify certain limitations of the data, and to briefly note additional sources of supply, which should be included in any comprehensive study. As with other research efforts seeking to broaden the coverage and further the development of an OIS in Massachusetts, an unmeasurable degree of distortion is introduced into the data due to the unavoidable combining and comparing of information based on different classification systems.20/

For the purpose of this study, supply has been limited to the following sources: completers of Public Vocational Education, CETA Skills Training and Apprenticeship institutional programs during 1979, the insured unemployed, (average of March, June, and September 1979), and applicants registered with the Massachusetts Employment Service (September 30, 1979). It is acknowledged that the impact of only using these components of supply will have greater or lesser significance depending on the particular occupation being considered. Furthermore, the supply sources under study are subject to varying degrees of overlap. For example, since an individual could both be registered with the Employment Service and have participated in a government training program, the possibility of double-counting does exist. Without further research, the extent to which this biases the findings is not yet known.

Although the supply of labor from the different sources is broken out by individual occupational title, an analysis solely on this basis will be severely limited. The primary reason is that a framework such as this would not have the necessary flexibility to accommodate a scenario where an individual does not limit her/his job search only to positions for which she/he has been specifically trained. Thus, to insure a more accurate reflection of the match between supply and demand, occupations which are closely related should be considered concurrently.

On the demand side, data from the Job Opening Survey are used as estimates of average monthly job openings. These estimates represent the average number of openings in each occupation available on the last day of a month (average of March, June, and September 1979).

In contrast with other sources of demand information, such as the employment projections presented in the DES publication, "Employment Requirements by Occupation, By Industry, 1976-1985", the Job Openings Survey does not just measure openings due to growth and labor force separations. Openings are included in the JOS figures, regardless of how they occur. For example, if an available position resulted from occupational mobility or a quit, it would

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20/ A detailed discussion of the technical and conceptual issues involved are included in the Department of Manpower Development report, "Efforts to Match Information on the Demand and Supply of Labor in Massachusetts".

still constitute a JOS openings, whereas it would not count as a projections opening.

Having outlined the characteristics and limitations of the data used, we will now proceed with an analysis of the relative match between supply and demand for a selected group of occupational titles. Although information is provided in Table 10 for twenty-four different occupations, due to the confines of time and space we will limit our discussion to the following titles: systems analysts and programmers, registered nurses, secretaries and stenographers, and machinists and tool-and-die makers. Additional sources of labor supply have been noted wherever their contributions are deemed to be integral to an accurate assessment of worker supply.

With the expansion in computer usage, there has been a growing demand for individuals versed in quantitative methods. Systems analysts and programmers are two occupations in particular that have experienced a significant growth in employment.

Graduates of public and private institutions of higher learning and occupational transfers are the primary contributors to the potential supply of labor, qualified to fill positions as systems analysts and programmers. In Massachusetts, formal programs have been established to retrain teachers, who already possess many of the requisite skills, in the art of programming. Public vocational education programs have been funded by the government to help address this increased need for workers trained in computer related fields.

In contrast with other sectors, because of the great demand for experienced personnel, the workforce in computer related industries has been highly mobile. The pattern for advancement has been for individuals to seek promotions outside of their own firms.

Establishments in the high technology sector have had to be especially innovative and adaptable in order that the availability and skills of a workforce not be a limiting factor in their expansion and growth. To bridge the gap between the mastery of general skills and the attainment of those specific to a particular industry, an increasingly prevalent trend among firms has been to offer in-house training programs for new employees. With an eye to enhancing the flexibility of their existing workforce, firms are beginning to combine the duties and responsibilities of the positions of systems analyst and programmer under a joint title.

The health services field has experienced tremendous expansion in the recent past. Growth has been spurred both by a heightening awareness among the populace of the importance of health care and the "extension of prepayment programs for hospitalization and medical care".21/

With the exception of the residual category "other health technologists and technicians" the other health related occupational titles included in our list of selected occupations (registered nurses; pharmacists, dieticians, therapists, and physicians assistants; and licensed practical nurses) had

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21/ Occupational Outlook Handbook, 1980-81, U. S. Department of Labor, Bureau of Labor Statistics, p. 397.

vacancy rates which were considerably higher than the average for the JOS as a whole. As registered nurses both commanded the largest employment base and reported the most openings in this cluster, we chose to highlight this occupation for more in depth study.

Although nurses are primarily employed in hospitals, a significant number choose to work in nursing homes, research and academia. In response to growing concern over hazards in the workplace, nursing skills will also be very much in demand in the newly emerging field of occupational safety and health. The question, however, is where will a trained workforce arise to meet the ever increasing growth and replacement needs of the nursing field?

The most noteworthy contributors to supply are graduates of private and public institutions above the secondary level and reentrants to the labor force. Three types of educational programs were identified as offering the required classroom instruction and on-the-job training. They were the following: 1) diploma - 3-year program conducted by hospitals and independent schools, 2) associate degree - 2-year nursing education program received in a junior or community college, and 3) bachelor of science degree - 4 or 5-year college or university education.22/ An additional source of supply are completers of public vocational education programs in nursing (see Table 10).

It appears that there are a substantial number of individuals not currently in the labor force who possess the requisite skills and training to be employed as nurses. For reasons including family responsibilities, inconvenient work location, aversion to shift work, and more lucrative alternatives, these individuals often choose either not to work or to work on their own. In Massachusetts, there is a state government office, the Nurses's Registry, whose primary function is to match self-employed private-duty nurses with patients who are in need of their services. As the nurses are not responsible to an employer, they are able to set their own wage-rates, as well as having the option of deciding which short-term positions they wish to accept.

Another occupational group where reentrants to the labor force make up a significant component of the potential supply are clerical workers. In particular we are going to consider the match between supply and demand for secretaries and stenographers.

As a result of the introduction and widespread use of dictation machines, there has been both a reduction in positions for stenographers and a projected employment decline. Thus, our discussion in reality pertains only to secretarial positions.

Completers of vocational education and CETA programs provide us with a first approximation of the number of individuals who complete secretarial training programs annually (see Table 10). While supply from these institutional programs alone appears to go a long way toward meeting demand, it is important to keep in mind that people do not limit their job search only to positions for which they have been specifically trained.

22/ Occupational Outlook Handbook, 1980-81, U. S. Department of Labor, Bureau of Labor Statistics, p. 396.

Given the sizeable number of people, classified as secretaries and stenographers, (either registered as applicants with ESARS or receiving unemployment compensation), and the numerous job openings reported to the JOS for this position, serious consideration must be given to the wisdom of funding training programs for the less-skilled high turnover jobs. As is often the case, the opportunities in this occupation are more numerous for the highly skilled, particularly those with training in specialized fields such as law, medicine and science. Efforts to prepare individuals for positions in this field should be directed towards changing the focus from one of quantity of individuals trained to one of quality training received by a participant.

Lastly, we will address the relative demand/supply match for machinists and tool-and-die makers. Simply put, machinists are skilled metal workers, who with additional training and background may advance to the position of tool-and-die maker. Factories employ the vast majority of these workers, although they are also an integral component of any small machine shop workforce. Small machine shops are primarily engaged in very specialized work; however, on an irregular basis they are commissioned by the large firms to do projects. The act of contracting out work gives a large establishment the added flexibility of increasing production when demand necessitates, without the financial burden of supporting additional workers during slack or normal workloads.

In general, there has been a growing demand by the population for machined goods, reflected in an increased need by employers for machinists, both to run the machinery and to fix it, thus mitigating the threat of costly breakdowns. In addition, since a substantial share of this workforce is nearing retirement, there will be numerous openings for machinists to meet replacement demand. A countervailing trend to this bright outlook, for those skilled in metalworking, has been the introduction of numerically controlled machine tools into the workplace. One ramification of this technological advancement has been a significant increase in the productive capacity of machinists; the magnitude of the impact that this innovation will have on employment, however, is not yet known.

The findings of the JOS lend further support to the contention that machinists are an occupational group in short supply and much in demand. The JOS vacancy rate for machinists exceeded 13 percent, the highest rate for any individual occupation. While for reasons discussed previously in other sections of this report, this percentage may, in fact, be artificially high, it it safe to assume that it is still one of the more significant shortage occupations. The vacancy rate for tool-and-die makers was also quite striking, more than two times the average for the JOS as a whole.

Formal apprenticeship programs are judged to be the most effective way of training new machinists. "Typical machinist apprentice programs consist of approximately 8,000 hours of shop training and about 570 hours of related classroom instruction".23/ It is noteworthy that the only significant apprenticeship programs listed in Table 10 were for machinists and tool-and-die makers.

Significant information and insight is to be gained from further research being conducted to provide a more accurate assessment of worker supply and employment prospects for these and other occupations. Undeniably, the collection of comprehensive supply-demand data will prove to be an invaluable asset to planners of classroom and on-the-job training programs

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23/ Occupational Outlook Handbook, 1980-81, U. S. Department of Labor, Bureau of Labor Statistics, p. 35

TABLE 10
DEMAND/SUPPLY
SELECTED OCCUPATIONAL TITLES
1979

SELECTED SOC TITLES	EMPLOYMENT	JOS 1/ OPENINGS	SOURCES OF SUPPLY: TOTAL ESTIMATED 2/ 1979 COMPLETIONS	SOURCES OF SUPPLY: PUBLIC VOC. ED.	SOURCES OF SUPPLY: CETA	SOURCES OF SUPPLY: APPREN-TICESHIP	REGISTERED APPLICANTS ESARS 3/	INSURED 4/ UNEMPLOYED
Computer, Mathematical, & Operations Research Occupations	8,520	711	168	167	1	--	*	*
Registered Nurses	42,954	2,192	724	724	0	--	718	198
Pharmacists, Dieticians, Therapists, & Physician's Assistants	8,637	340	70	59	11	--	200	*
Writers, Editors, Artists, Entertainers & Athletes	16,213	512	219	204	15	--	1,372	808
Licensed Practical Nurses	17,277	1,213	800	746	54	--	*	*
Other Health Technologists & Technicians	23,088	412	491	456	30	5	229	120
Programmers	9,880	688	256	193	63	--	*	*
Other Technologists & Technicians	45,830	2,178	2,019	1,747	272	--	*	*
Sales Occupations, Commodities	135,730	3,409	2,234	2,214	20	--	2,227	1,627
Other Marketing & Sales Occupations	14,753	322	299	293	6	--	*	*
Secretaries & Stenographers	80,380	2,729	4,994	4,730	264	--	2,063	1,179
Typists	31,075	786	6,434	6,121	313	--	*	*
Bookkeeping, Accounting, & Auditing Clerks	41,203	790	1,889	1,678	208	3	1,737	1,230
Waiters & Waitresses	50,019	2,002	273	273	0	--	3,826	1,331
Cooks	22,874	1,318	833	676	157	--	1,305	1,036
Nurses Aides, Orderlies, & Attendants	39,745	2,625	736	656	80	--	*	*
Truck Drivers	30,012	293	306	299	7	--	2,448	2,924
Tool-and-Die Makers	4,854	335	125	55	34	36	76	81
Machinists	9,952	1,524	304	114	101	89	*	*
Welders and Cutters	6,783	294	610	570	40	--	612	497
Assemblers	51,924	2,295	1,213	984	229	--	*	*
Production Inspectors, Testers, Samplers, & Weighers	19,794	426	1,010	980	30	--	*	*
Computer & Peripheral Equipment Operators	5,691	124	251	183	68	--	255	245

1/ JOS openings are the average of the number of openings on the last day of the months of March, June, and September 1979.

2/ "Efforts to Match Information on the Demand and Supply of Labor in Massachusetts," Department of Manpower Development, Christine LeCam and Pamela Frugoli.

3/ Average of active applicants at Employment Service offices on the last day of March, June, and September 1979.

4/ Average of the insured unemployed (week ending the 12th) for March, June, and September 1979.

VIII Part-Time Openings

Included in the 68,391 JOS openings were 14,258 part-time openings (21 percent). Reliable information about part-time job openings (positions expected to provide less than 35 hours of work a week) was obtained for eight occupational groups. The greatest number of part-time jobs were concentrated in three of the eight occupational categories: nurses aides, orderlies and attendants; other service occupations, except private household; and waiters and waitresses. The hours worked in the nurses aides, orderlies and attendants group are determined by the hospital environment that requires attendance on a twenty-four hour, seven day a week basis. Approximately two out of every three such openings were for part-time jobs. Likewise, other service occupations, except private household, (including such occupations as barber, bartender, kitchen worker, etc.), do not generally conform to the typical 9 to 5, 40-hour work week. Part-time openings approached two-thirds of all openings. Waiter and waitress occupations also fall into the category of jobs with irregular working hours. The latter group had the highest ratio of part-time openings to all openings, a full 81 percent. While part-time openings were most significant during the June survey the percentage was also very high during March and September.

Conversely, the occupational group, "other technologist and technicians except health", recorded a mere one percent part-time openings. This contrasts sharply with the 21 percent average for all occupational categories.

TABLE 11
TOTAL JOS OPENINGS AND PART-TIME OPENINGS
IN SELECTED OCCUPATIONAL GROUPS
1979

SOC	OCCUPATIONAL GROUP	JOS OPENINGS[1]	PART-TIME OPENINGS[2]	PERCENT OF PART-TIME OPENINGS TO TOTAL OPENINGS
	TOTAL[3]	68,391	14,258	.21
2900	Registered Nurses	2,192	602	.28
3602	Other Health Technologists & Technicians	412	88	.21
3902	Other Technologists & Technicians except Health	2,178	16	.01
4702	Other Clerical Occupations	3,588	912	.25
5213	Waiters & Waitresses	2,002	1,615	.81
5236	Nurses Aides, Orderlies, & Attendants	2,625	1,757	.67
5240	Cleaning & Building Service Occupations	1,084	277	.26
5202	Other Service Occupations, Except Private Household	2,715	1,752	.65

1/ JOS openings are the average of the number of openings on the last day of the months of March, June, and September 1979.

2/ Positions expected to provide less than 35 hours of work a week.

3/ Includes all occupational groups

IX Future Openings

The job openings schedule mailed to establishments included the request for job openings with future starting dates. Future openings refer to openings for which a firm is actively recruiting outside of the firm, but which are related to jobs that are currently occupied or unavailable for immediate occupancy. However, unlike openings unfilled 30-days or more and part-time openings, openings with future starting dates were not included in the total count of current job openings. Information on future openings is of value because it gives an added dimension to the demand for labor.

In addition to the 68,391 current job openings in the JOS there were 17,855 openings with future starting dates. This means that there were nearly four current job openings for every future opening. Because of the limited size of the sample, reliable data was obtained for only 10 occupational groups. A further limitation to the analysis of future openings was the omission of government from the sample. If government were included in the survey, a much larger number of school teacher openings would have been included in the count, especially during the spring and summer when September recruiting takes place. Also, many future openings would be expected in the early spring because of the seasonal nature of the construction industry. Unfortunately, data for most construction occupations was deemed unreliable.

Table 12 shows that the highest ratio of future openings to current openings occurred in sales occupations, probably due to the highly seasonal nature of business in retail trade. Occupations such as executives and managers have a moderate ratio of future openings to current openings. These future openings are often anticipated in advance because of the search-time required to find qualified applicants. In occupations such as nursing and secretarial work, the demand for workers is constant and most openings are readily available.

TABLE 12
TOTAL JOS OPENINGS AND FUTURE OPENINGS IN SELECTED OCCUPATIONAL GROUPS
1979

SOC	OCCUPATIONAL GROUP	JOS OPENINGS[1]	FUTURE OPENINGS[2]	RATIO OF FUTURE OPENINGS TO JOS OPENINGS
	TOTAL[3]	68,391	17,855	.26/1
1102	Other Executive, Administrative & Managerial Occupations	2,353	470	.20/1
2900	Registered Nurses	2,192	224	.10/1
4100	Sales Occupations, Commodities	3,409	2,195	.64/1
4302	Other Marketing & Sales Occupations	322	119	.37/1
4610	Secretaries & Stenographers	2,729	190	.07/1
7213	Machinists	1,524	187	.12/1
7502	Machine Operators & Tenders	4,484	490	.11/1
7720	Assemblers	2,295	603	.26/1
7800	Production Inspectors, Testers, Samplers, & Weighers	426	153	.36/1
7902	Other Production Workers	2,742	226	.08/1

1/ JOS openings are the average of the number of openings on the last day of the months of March, June, and September 1979.

2/ Openings for which a firm is actively recruiting outside of the firm, but which relates to jobs that are currently occupied or unavailable for immediate occupancy.

3/ Includes all occupational groups

X Comparison of Openings and Unemployment over The Three Surveys

Table 13 presents monthly data on job openings and unemployment for the three survey periods of March, June, and September 1979. The survey-to-survey total job openings changes were determined to be statistically valid to publish total monthly openings for each of the three surveys.

The three surveys did not indicate any clear cut relationships between openings and unemployment. While openings slipped from 69,100 in March to 62,400 in June (-9.7 percent), total unemployment dropped from 173,000 to 148,000 (-16.9 percent). Conversely, while openings jumped up to 73,700 in September (+18.2 percent), unemployment only reached 155,300 (+4.9 percent). While the direction of the change was similar for both March-June and June-September, the overall March-September change was quite different. Openings climbed by 6.7 percent as unemployment was dropping by 10.2 percent. Although the ratio of unemployment to openings did show a continuing decline (2.5 to 1 in March, 2.4 to 1 in June, and 2.1 to 1 in September) if seasonally adjusted unemployment figures had been used, the September ratio would have been 2.3 percent (172,500). Seasonally adjusted unemployment was virtually identical to unadjusted unemployment for the first two survey periods.

Any comparison between job openings and unemployment could be clouded by the reliability of the monthly unemployment figures. Unemployment data from the Current Population Survey (CPS) is considered far more reliable on a quarterly rather than a monthly basis. For purposes of this analysis an average of two months unemployment data was used since unemployment is calculated in the middle of the month and job vacancies on the last day of the month. Still, there were unusually wide disparities during two of three survey periods. Unemployment was reported as 193,900 in March and 152,000 in April (173,000 average) and 186,200 in September and 123,900 in October (155,300) average.

While there is no accepted agreement as to what is an appropriate ratio of unemployment to job openings, a few generalities can be made. If the number of openings are very small compared to the unemployed, the data would support some job creation effort. Conversely, if the level of job openings was substantial compared to total unemployment there would be justification for emphasizing the reduction of structural and/or frictional unemployment problems. Occupational detail on both unemployment and job openings could provide a basis for determining the relative extent of structural and frictional unemployment among various occupations. Unfortunately, comprehensive occupational unemployment data is not available below the National level. In the following section, however, job vacancy data will be compared with selected occupational unemployment data from the quarterly DES surveys on the "Characteristics of the Insured Unemployed".

TABLE 13
UNEMPLOYMENT AND JOS OPENINGS
MARCH, JUNE, AND SEPTEMBER 1979

MONTH	JOS 1/ OPENINGS	VACANCY RATE	UNEMPLOYMENT 2/	UNEMPLOYMENT RATE	RATIO OF UNEMPLOYMENT TO OPENINGS
MARCH	69,085	3.2	173,000	6.0	2.5/1
JUNE	62,375	2.8	148,000	5.0	2.4/1
SEPTEMBER	73,713	3.3	155,300	5.4	2.1/1

1/ Openings on last day of month

2/ Average of March-April, June-July, September-October, unemployment from Current Population Survey (CPS) to maintain comparability with end of month JOS data. Includes all unemployed (i.e. entrants, re-entrants, former self-employed, persons with last attachment to government or agriculture sector).

XI Comparison of the Insured Unemployed and JOS Openings by Occupational Category

The Division of Employment Security gathered quarterly statistics on the "Characteristics of the Insured Unemployed in Massachusetts". As one indicator of supply, it can be compared with JOS occupations on the demand side. Similar to the JOS survey, the data for the March, June, and September 1979 quarterly reports on the characteristics of claimants were averaged to give us one representative figure for 1979. It must be kept in mind, however, that insured unemployment only averaged approximately 40 percent of total unemployment during the comparable three survey months. We have no occupational data for the remaining 60 percent of the unemployed here in Massachusetts.

The ratio of insured unemployed to JOS openings can still give us an idea of the supply/demand relationship within various occupations. If the number of insured unemployed was substantially less than the job openings, a case might be made either for a structural imbalance between job opportunities and people qualifed to fill them or a supply shortage because of the unattractiveness of the job. A close match between the number of job openings and the unemployed may suggest that a major part of unemployment is frictional (or short-term). The causes of this may be a geographic imbalance, a lack of labor market information especially among new entrants, or disincentives to work. However, it is difficult to utilize insured unemployment as a measure of frictional unemployment since a significant portion of the frictionally unemployed would not be insured (i.e. new entrants, quits). If the number of insured unemployed is significantly larger than the job openings, this could measure either the structural effect due to technological change or layoffs as a result of poor business conditions.

In our analysis we were able to match up 19 JOS survey occupational groups with comparable insured unemployed occupational titles. Occupations with higher vacancy rates were usually found to have a much larger number of job openings than insured unemployed. These two factors complement each other in our analysis of those occupations having structural imbalance due to a lack of qualified personnel. The occupations included registered nurse; the combined group of engineers, architects, technologists, and technicians; and tool and die makers. Less skilled occupations such as bank tellers, secretaries and stenographers, and sales (commodities) were also found to have significantly fewer insured unemployed than job openings. In these cases, while demand is moderate, we may be finding some unemployed leaving these occupations to transfer to other occupations. A sizable number of job seekers in these occupations would be eliminated from our analysis because they are new entrants who are thus ineligible for unemployment compensation. Certain occupations are closely matched between job openings and insured unemployed. These occupations included cooks, cleaning and building service occupations, and "other clerical occupations". Some of the occupations in these groups are high turnover jobs with a tendency towards lower pay, higher incidence of unfavorable working conditions, and little upward mobility.

Occupations having a much larger number of insured unemployed compared to job openings include welders, and cutters; truck drivers; social scientists and urban planners; and computer and peripheral equipment operators. In the first two cases we may be seeing the effect of temporary layoffs. The high ratio of insured unemployed among social scientist and urban planners may partially reflect a glut of persons with these skills as well as the failure to include government job openings. As for computer and peripheral equipment operators, technological advances in computer hardware has lessened the demand for operating personnel.

TABLE 14
INSURED UNEMPLOYED AND JOS OPENINGS BY MAJOR OCCUPATIONAL CATEGORY
1979

OCCUPATIONAL GROUP	JOS 1/ OPENINGS	VACANCY RATE	INSURED 2/ UNEMPLOYED	RATIO INSURED UNEMPLOYED TO JOS OPENINGS
TOTAL	68,391	3.1	73,787 3/	1.08/1
TOTAL	68,391	3.1	64,308 4/	.94/1
WHITE COLLAR	31,925	2.4	25,580	.80/1
Professional, Technical, & Kindred	13,472	3.2	5,941	.44/1
Managers	2,353	1.1	6,078	2.58/1
Sales Workers	4,837	2.9	2,816	.58/1
Clerical Workers	11,263	2.1	10,745	.95/1
BLUE COLLAR	25,137	3.3	38,713	1.54/1
SERVICE	10,772	2.8	7,724	.72/1
AGRICULTURAL WORKERS 5/	147		1,701	--
UNCLASSIFIED	410		69	--

1/ JOS openings are an average of the total openings on the last day of the months of March, June, and September 1979. They exclude government openings.

2/ Insured unemployed figures are an average for the months of March, June, and September 1979 from the quarterly DES surveys on the "Characteristics of the Insured Unemployed".

3/ Includes government to maintain comparability with insured unemployed data by individual occupational groups.

4/ Excludes government.. Figures would be comparable to total JOS.

5/ JOS openings do not include openings in agricultural industries.

TABLE 15
INSURED UNEMPLOYED AND JOS OPENINGS BY SELECTED OCCUPATIONAL GROUPS
1979

SOC	OCCUPATIONAL GROUP	JOS OPENINGS 1/	VACANCY RATE	INSURED UNEMPLOYED 2/	RATIO INSURED UNEMPLOYED TO JOS OPENINGS
1412	Accountants & Auditors	669	3.0	448	.67/1
1102	Other Executive, Administrative, & Managerial Occupations	2,353	1.1	2,953	1.25/1
ENGINEERS, ARCHITECTS, TECHNOLOGISTS, & TECHNICIANS		4,460	4.3	947	.21/1
1628	Civil Engineers				
1633	Electrical Engineers				
1635	Mechanical Engineers				
1602	Other Engineers & Architects				
3902	Other Technologists & Technicians				
1800	Natural Scientists	335	3.8	118	.35/1
1900	Social Scientists & Urban Planners	63	1.4	611	9.70/1
2900	Registered Nurses	2,192	4.9	198	.09/1
3202	Writers, Editors, Artists, Entertainers & Athletes	512	3.0	808	1.58/1
4100	Sales (Commodities)	3,409	2.4	1,627	.48/1
4610	Secretaries & Stenographers	2,729	3.3	1,179	.43/1
4682	Bank Tellers	502	3.8	207	.41/1
4712	Bookkeepers, Accountants, & Auditing Clerks	790	1.9	1,230	1.56/1
4850	Computer & Peripheral Equipment Operators	124	2.1	245	1.98/1
4702	Other Clerical Occupations	3,588	1.3	3,869	1.08/1
5213	Waiters & Waitresses	2,002	3.8	1,331	.66/1
5214	Cooks	1,318	5.4	1,036	.79/1
5240	Cleaning & Building Service Occupations	1,084	1.5	880	.81/1
6412	Truck Drivers	293	0.9	2,924	9.98/1
7211	Tool & Die Makers	335	6.4	81	.24/1
7714	Welders & Cutters	294	4.1	497	1.69/1

1/ JOS openings are an average of the total openings on the last day of the months of March, June, and September 1979. They exclude government openings.

2/ Insured Unemployed figures are an average for the months of March, June, and September 1979 from the quarterly DES surveys on the "Characteristics of the Insured Unemployed". Individual occupational categories include government.

XII Vacancy Rates by Major Industry Group

Job Openings for the nonagricultural industries in Massachusetts are presented in Table 16. The figure 68,391 represents the average of the total estimated job openings on the last day of March, June, and September 1979. The employment total of 2,159,261 is the average private nonagricultural wage and salary employment for the months of March, June, and September 1979. The resulting overall job vacancy rate is 3.1 percent. the manufacturing job vacancy rate is 2.9 percent, while the nonmanufacturing industries, which employ over twice the number of workers, record a vacancy rate of 3.2 percent.

Thirty percent of the JOS openings had been open for a month or longer. Although the manufacturing sector had a lower job vacancy rate, it contained a higher proportion of these hard-to-fill openings than did nonmanufacturing (33 percent and 29 percent respectively). This higher month-old figure in manufacturing reflects the relatively higher levels of skill and training needed for many of the manufacturing jobs.

The JOS data for the manufacturing sector shows the estimated current job openings in this division to be just over 19,000. This figure represents about 28 percent of the total job openings in the State. During this period the estimated total employment for the manufacturing sector was about 675,000 or 31 percent of the State's total private employment. Thus, with 31 percent of the employment and only 28 percent of the current job openings the manufacturing sector may have difficulty maintaining its share of the State's overall employment growth. The occupational estimates in a previous section of this report show that occupations normally associated with durable goods manufacturing, which includes high technology companies, have the highest number of openings and vacancy rates. The strong employment expansion in the durable goods industries will counteract a stagnation in the nondurable goods sector. The occupations normally associated with soft goods industries generally have lower vacancy rates. As mentioned, 33 percent of the current job openings in the manufacturing group were open a month or longer. This relatively large number of hard-to-fill job openings is indicative of a shortage in many of the skilled occupations. This assumption is supported by the fact that wage levels are higher, on the average, in manufacturing than in nonmanufacturing. Another indication that these manufacturing openings are frequently for better paying position is the fact that only 5 percent of the openings in the manufacturing sector are for part-time jobs as compared to 21 percent of all openings.

The future openings data indicates a much smaller proportion of manufacturing openings with future starting dates. Future openings in manufacturing are only 17 percent of current openings compared with all future openings which are 26 percent.

While the data on current and future openings point to a relatively smaller manufacturing growth in the immediate future, the data on openings over a month old indicate there are several manufacturing-oriented occupations in short supply. These occupational areas deserve serious consideration in the planning of training programs and educational curricula.

The JOS data for the nonmanufacturing sector shows the estimated job openings to be over 49,000, or about 72 percent of the total job openings in Massachusetts. During this period, nonmanufacturing employment numbered 1,485,000 or 69 percent of the State's total private employment. With 69 percent of the employment and 72 percent of the job openings, there is further indication that the nonmanufacturing sector should continue to increase its overall employment share into the immediate future.

Future openings in the nonmanufacturing sector are 30 percent as high as current openings, a ratio nearly twice that of the manufacturing sector. The frequency of future openings points out possible additional growth prospects for employment in the nonmanufacturing sector but more likely, the seasonal nature of the jobs.

The two major groups in the private nonmanufacturing sector are wholesale and retail trade and services with 26 percent and 27 percent of total private employment respectively. The trade group had only 22 percent of the job openings and a relatively low vacancy rate of 2.7 percent, indicative of a slowdown in the retail business during 1979. The percentage of month-old openings (28 percent) might be considered a little high when compared with the below average vacancy rate. A probable explanation is the fact that 35 percent of the openings are for part-time jobs. Other contributing factors to be considered are the relatively low wage rates and erratic work schedules that are common to the retail trade business, making openings harder to fill.

The percentage of future trade openings is 34 percent, a higher proportion than the nonmanufacturing division as a whole. The fairly large number of future openings in an industry group that is experiencing a relatively low job vacancy rate is probably attributed to the seasonal nature of the retail business rather than optimism on the part of retailers over future business growth.

The second major group in the nonmanufacturing sector, services, accounted for 27 percent of the State's total private employment and 32 percent of the current job openings. These figures indicate the continuing growth and importance of this industry group to the State's overall economy.

The 3.7 percent vacancy rate for the service related group is larger than the other published industry groups. The medical and health services make up the largest segment of the services group in the State. The high vacancy rate in services is indicative of the employment growth opportunities in health-related fields. Along with the medical and health subgroup, professional and business-related services contributed to the high job vacancy rate for the service group. Conversely, however, the availability of high turnover jobs can also boost the job vacancy rate, thus causing an illusion of expanded job opportunity.

Of the 21,698 job openings in the services group, 31 percent or about 6,700 had been open a month or longer. While undoubtedly there are job openings in the service group where the supply of qualified applicants has not kept up with the demand there are some elements inherent in the overall service group that would contribute to making many of the current openings hard-to-fill. Some of these considerations are rotating work schedules, many more lower skill jobs than in manufacturing with resultant lower wages, and a high proportion of part-time openings (30 percent).

The finance, insurance and real estate group had 6 percent of the job openings with 7 percent of the total private employment. With only 18 percent of the openings a month-old or longer, the smallest number of hard-to-fill jobs of any industry group, it would seem that the supply and demand for jobs in this industry group is in relatively good balance.

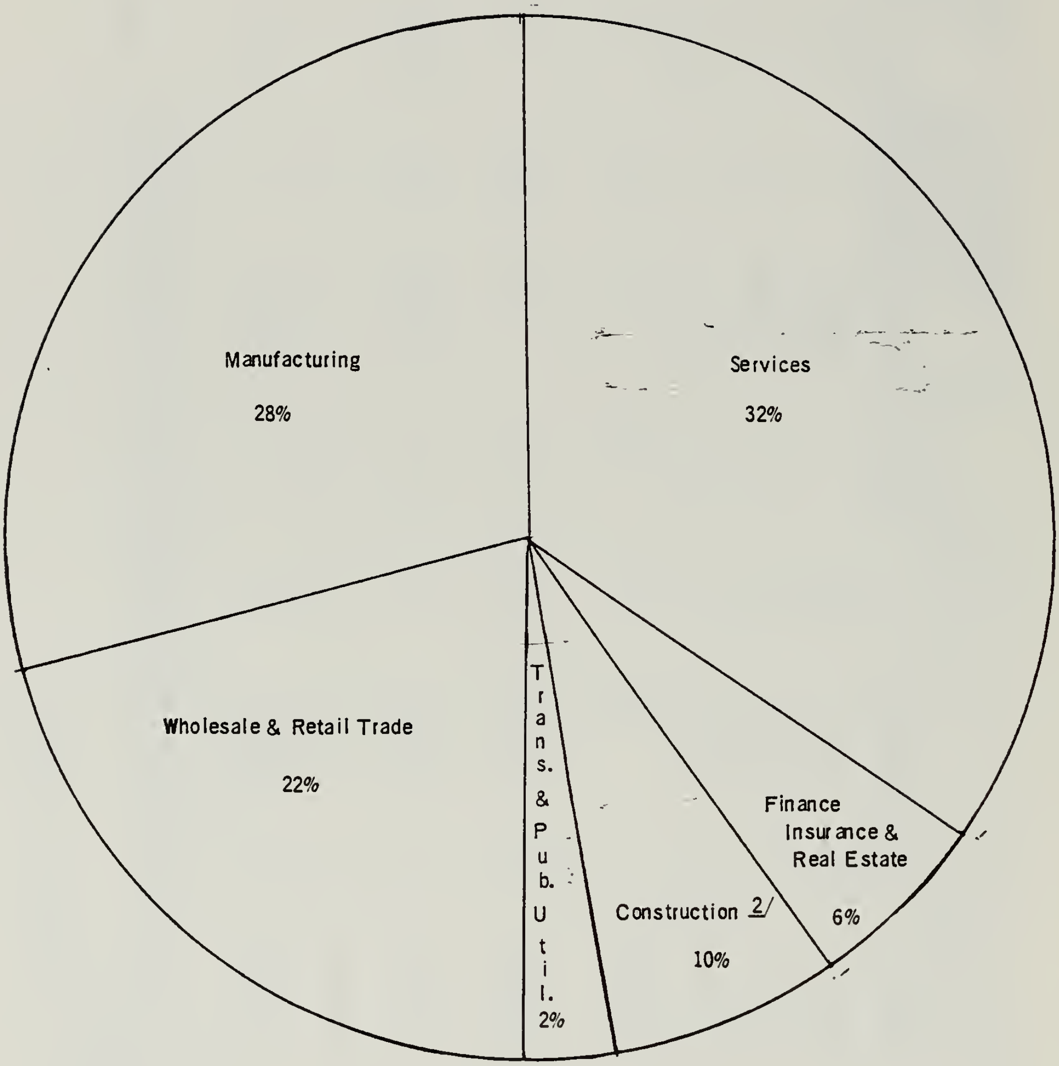
The transportations, communications, and utilities sector recorded the lowest job vacancy rate. The 1.3 percent rate was less than half the rate for the next highest industry group.

TABLE 16
JOB OPENINGS SURVEY ESTIMATES
BY INDUSTRY GROUP
1979

INDUSTRY GROUP	EMPLOYMENT 1/		JOS OPENINGS 2/			MONTH OLD OPENINGS 3/		PART TIME OPENINGS 3/		FUTURE OPENINGS 4	
	NUMBER	%	NUMBER	%	VACANCY RATE	NUMBER	% OF JOS OPENINGS	NUMBER	% OF JOS OPENINGS	NUMBER	RATIO OF FUTU OPENINGS TO JOS OPENING
Total	2,159,271	100	68,391	100	3.1	19,881	30	14,258	21	17,855	.26/1
Manufacturing	674,821	31	19,143	28	2.8	6,346	33	959	5	3,320	.17/1
Non-Manufacturing	1,484,450	69	49,248	72	3.2	13,535	27	13,299	27	14,535	.30/1
Construction	78,287	4	5/	5/	5/	5/	5/	5/	5/	5/	5/
Transportation & Public Utilities	117,166	5	1,533	2	1.3	5/	5/	5/	5/	5/	5/
Wholesale & Retail Trade	570,106	26	15,533	22	2.7	4,380	28	5,460	35	5,268	.34/1
Finance, Insurance, Real Estate	146,583	7	4,363	6	2.9	799	18	5/	5/	5/	5/
Services	572,308	27	21,698	32	3.7	6,670	31	6,549	30	6,037	.28/1

1/ Employment figures are an average for the months of March, June and September 1979.
2/ JOS openings are an average of the number of openings on the last day of the months of March, June and September 1979.
3/ Included in total JOS openings.
4/ Not included in total JOS openings.
5/ Relative Standard Error above accepted criteria.

TABLE 17
PERCENTAGE OF JOS OPENINGS BY INDUSTRY GROUP
1979 1/



1/ JOS openings are an average of the number of openings on the last day of the months of March, June, and September 1979.

2/ JOS openings included even though relative standard error was above accepted criteria.

XIII Comparison of New Hire Rate and Vacancy Rate over the Three Surveys

The comparison of job openings with new hires can provide insight into the relative supply and demand of labor. Job openings data alone may reflect changes in the level of recruiting activity rather than changes in the relationship of supply and demand. The comparison of new hires and job vacancies in manufacturing for each of three months of 1979 is presented in Table 18. Since data collection of new hires was not part of the JOS program in 1979 we are limited in our comparison to new hires data in manufacturing collected under the monthly Labor Turnover program. Subsequently, JOS surveys did collect comprehensive data on new hires. An extensive analysis of new hires data by occupation and how it relates to job vacancy data will be forthcoming in a future report. The analysis by occupation could be particularly useful in identifying skill shortages.

The comparison of new hires and job vacancies in Table 18 shows the trend in labor supply and demand in manufacturing during the months of March, June, and September 1979. New hires are increasing over the period while job openings are decreasing at a slightly slower rate, implying that the supply is sufficient to meet the increased hiring activity. Caution must be observed, however, since our analysis is limited to the aggregate manufacturing level. A detailed analysis at the occupational group level would undoubtedly produce varying trends in labor supply and demand.

The level of job openings and the ratio of openings to new hires are important factors in analyzing the changes in the supply and demand of labor. In Table 18 we see that during March the level of job openings were at their highest point of the period while the new hires were at their lowest point. This relatively high unmet demand in March was gradually being overcome as seen by the shrinking figures for June and September. The ratio of openings to new hires identified tightness in the labor market. It shows that the relative tightness of the labor supply in March (1.29 to 1) was easing in June (.76 to 1) and September (.67 to 1) as supply was more adequately meeting demand. Before any conclusions can be drawn, however, it is important to consider the seasonal pattern of new hires. The jump in the rate from 2.6 percent in March to 3.6 percent in June is not inconsistent with past years trends.

Again, a trend in the ratio of openings to new hires by occupation would be very helpful in isolating those occupations where a shortage is either easing or becoming more severe. Planning can thus be geared toward those occupations where there exists a large and growing number of job openings as well as a high and growing ratio of openings to new hires.

TABLE 18
NEW HIRES AND JOS OPENINGS
MANUFACTURING
1979

MONTH	EMPLOYMENT	NEW HIRES 1/		JOS OPENINGS 2/		RATIO JOS OPENINGS TO NEW HIRES
		NUMBER	NEW HIRE RATE %	NUMBER	VACANCY RATE %	
March	658,500	17,182	2.6	22,108	3.2	1.29 to 1
June	672,500	23,927	3.6	18,188	2.6	.76 to 1
September	665,900	25,526	3.8	17,134	2.5	.67 to 1

1/ New hires are all new hires occurring during the month as reported in the Labor Turnover Program.

2/ JOS openings are the number of openings on the last day of the month.

XIV Comparison of the Insured Unemployed and JOS Openings by Industry

As was done with the occupational data, an average of industry figures from the "Characteristics of the Insured Unemployed" were matched against JOS openings. While a comparison of industry groups is too broad and diversified to provide relevance to local policy makers, some interesting observation can be noted.

For the selected industry groups in Table 19, the comparison shows four out of five groups with an excess of job openings over the number of insured unemployed. Insured unemployed in the services sector is approximately 50 percent of job openings while the percentage of insured unemployed in the finance, insurance, and real estate group is even less (43 percent) In two other groups, manufacturing and wholesale and retail trade, the information shows a substantial match between the insured unemployed and job openings. The only industry group with an excess of insured unemployed to job openings is the transportation and public utility group with a ratio of 2.57 insured unemployed to 1 job openings.

On the surface it would appear that there is an imbalance between the excess supply of transportation and public utility workers and the unmet demand in the finance, insurance, and real estate and service sectors. The causes of this industry imbalance, however, are quite complex. For example, temporary layoffs could swell the ranks of the insured unemployed, while an abundance of jobs offering low wages and unattractive working conditions could create an illusion of short supply. Also, the number of insured unemployed in the service and finance, insurance, and real estate sectors may not be a fair indication of the number of unemployed who are either new jobseekers or not eligible for unemployment compensation.

TABLE 19
INSURED UNEMPLOYED AND JOS OPENINGS BY MAJOR INDUSTRY GROUP
1979

INDUSTRY GROUP	JOS OPENINGS 1/	INSURED 2/ UNEMPLOYED	RATIO INSURED UNEMPLOYED TO JOS OPENINGS
TOTAL	68,391	64,308	.94/1
Manufacturing	19,143	18,257	.95/1
Construction	3/	11,667	3/
Transportation, Communication, & Public Utilities	1,533	3,933	2.57/1
Wholesale & Retail Trade	15,533	15,078	.97/1
Finance, Insurance, & Real Estate	4,363	1,857	.43/1
Services	21,698	11,271	.52/1

1/ JOS openings are an average of the total openings on the last day of the months of March, June, and September 1979.

2/ Insured unemployed figures are an average for the months of March, June, and September 1979 from the quarterly DES surveys on the "Characteristics of the Insured Unemployed". Totals exclude Government but include unclassified.

3/ Relative Standard Error above accepted criteria

XV Vacancy Rates by Employer Size Group

Table 20 presents data broken down by the employment size of establishments. Comparisons between size classes can be drawn by analyzing employment, number of units, JOS openings, and vacancy rates.

Although smaller size classes contain many more establishments, the larger size classes account for a much larger proportion of total employment. A case in point is the three largest size classes (250 employees and above). They are approximately one percent of the total units in the Commonwealth, but represent 43 percent of private nonagricultural wage and salary employment. The largest concentration of job openings are in the middle size firms. An example is the three size classes that range from 20 to 249 employees; they contain 44 percent of the job openings. The 50-99 and 100-249 size classes are the two largest in terms of job openings. The number of openings drop off sharply in the 250-499 and 500-999 size classes. The size class 1,000 and above accounts for over 20 percent of employment but only offers 12 percent of the job openings. This contrasts dramatically with the median size class (50-99) that represents only 11 percent of employment but offers 16 percent of the job openings.

A trend can also be seen in the comparison of vacancy rates. A generalization can be made that the higher vacancy rates tend to occur in the smaller size classes. The size class 1-3 [24/] really stands out in comparison with the other eight. This category has almost a 10 percent vacancy rate compared to a 4.3 percent rate for the next highest category (50-99). On the other hand, the largest size class (1,000 and above) has only a 1.8 percent vacancy rate. In fact, the vacancy rate declines rapidly for establishments with 100 or more employees. This occurrence can be attributed to several factors other than their larger employment base. One reason is the inability of the smaller size firms to compete financially with larger firms for new employees. Large companies can attract potential workers by offering higher wages, as opposed to smaller companies who have less capital to work with, so their job openings may go unfilled. Also, a larger company may find it easier to find a candidate for a hard-to-fill job openings because it has its own internal labor market and can promote or transfer an existing employee into the hard-to-fill position if it cannot find a candidate in the external labor market. Smaller firms do not have this option because of the limited number of employees they can move. Consequently, a hard-to-fill job will remain vacant for a longer period of time in the smaller size class. These factors contribute to the higher vacancy rates in the smaller firms.

In the case of new and emerging high technology oriented establishments, high job vacancy rates are attributed to rapid growth. As mentioned earlier in the report, a failure to adequately represent these new firms could result in a downward bias of job openings estimates.

[24/] Although the relative standard error was much higher for size class 1-3 than for any of the other eight size classes, it still met the established criteria.

TABLE 20
JOB OPENINGS SURVEY ESTIMATES BY SIZE CLASS
1979

SIZE CLASS	EMPLOYMENT 1/		JOS OPENINGS 2/		VACANCY RATE
	NUMBER	%	NUMBER	%	
Totals	2,159,271	100	68,391	100	3.1
1-3	76,792	4	8,044	12	9.5
4-9	156,175	7	6,437	9	4.0
10-19	164,876	8	6,168	9	3.6
20-49	261,927	12	9,410	14	3.5
50-99	240,300	11	10,837	16	4.3
100-249	325,073	15	9,678	14	2.9
250-499	234,674	11	4,332	6	1.8
500-999	239,277	11	5,205	8	2.1
1000+	460,177	21	8,278	12	1.8

1/ Employment figures are an average for the months of March, June, and September 1979.

2/ JOS openings are an average of the number of openings on the last day of the months of May, June, and September 1979.

XVI Response Rates of High Technology Establishments

Another reason that the Job Openings Survey may not truly reflect the actual demand for labor in high technology establishments [25] is the lower rate of response. The percentage of useable response [26] was only 75 percent in high technology establishments as opposed to 83 percent for all sample units (see Table 21). A great disparity, however, exists when response is broken down by size class. Useable response for all sample units was above 80 percent in all size classes except 1-3 [27], 500-999, and 1,000 and above, while in high technology establishments response surpasses 95 percent in all size classes except 500-999 and 1,000 and above. Response from high technology was actually greater in all size classes except the largest (1,000 and above) [28]. The response differential in this size class, however, was dramatic. While useable response was obtained from 66 percent of all sample members, the response from high technology establishments was a paltry 39 percent. The composition of the sample units must be analyzed to see how this problem is magnified. Only 12 percent of all sample units were in the 1,000 and above size class as contrasted to 33 percent of high technology units. Since one-third of these sample units are in the largest size class, the poor response has a dramatic effect on lowering overall high technology response (75 percent) and useable high technology employment (53 percent). Furthermore, since sample weighting for nonresponse is done within size class, the share of high technology job openings in establishments of 1,000 employees and above would be underrepresented.

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[25] SIC's 283,348,357,361,362,363,364,365,366,367,369,376,379,381,382,383,384, 385,386,387

[26] The useable response rate in this context is calculated by dividing the number of units submitting a useable response by the number of units in the original sample. Those units out of business or otherwise unmailable have not been subtracted from the denominator.

[27] Lower response is partly attributable to the number of establishments out of business.

[28] Many large high technology firms are experiencing dramatic growth rates, thus lower job vacancy rates would not be expected among the high technology establishments in size class 1,000 and above.

TABLE 21
PERCENT DISTRIBUTION OF JOS SURVEY RESPONSE
ALL ESTABLISHMENTS AND HIGH TECHNOLOGY 1/ ESTABLISHMENTS
BY SIZE CLASS
1979 2/

SIZE CLASS	TOTAL JOS ESTABLISHMENTS PERCENT	HIGH TECHNOLOGY JOS ESTABLISHMENTS PERCENT	USEABLE RESPONSE RATE 3/ ALL ESTABLISHMENTS PERCENT	USEABLE RESPONSE RATE 3/ HIGH TECHNOLOGY ESTABLISHMENTS PERCENT
TOTAL	100	100	83	75
1-3	9	8	72	96
4-9	11	1	91	100
10-19	10	5	92	96
20-49	13	5	93	100
50-99	11	4	93	100
100-249	12	7	83	96
250-499	11	15	80	96
500-999	10	21	77	78
1000+	12	33	66	39

[1] High technology firms are those listed in the following Standard Industrial Classification (SIC) codes: 283,348,357,361,362,363,364,365,366,367,369,376,379,381,382,383,384,385,386,387

[2] JOS openings are an average of the number of openings on the last day of the months of March, June, and September 1979.

[3] Useable response rate in this context is calculated by dividing the number of units submitting a useable response by the number of units in the original sample. Those units out of business or otherwise unmailable have not been subtracted from the denominator.

XVII Conclusion and Recommendations

As a result of the Massachusetts experience in the Pilot Job Openings Survey (JOS), we find that fairly accurate and complete data on job vacancies can be obtained from employers in a cost-effective manner. Our average response rate in the first three survey rounds was well over 80 percent. The implementation of a nationwide federal-state cooperative program for the collection of job vacancy data appears to be both a feasible and worthwhile endeavor. There is no adequate substitute for current job vacancy statistics. Both help-wanted advertisements and orders filed with the Employment Security Job Bank system have a very limited range of coverage.

The results of the surveys thus far analyzed are of special significance to Massachusetts. The data tends to confirm our beliefs on the causes of the State's current economic vitality. Massachusetts employment is growing and the unemployment rate is running considerably below that of the nation. This is happening despite the movement of a few manufacturing firms out of the state, the energy crisis and the national recession. One of the explanations for this vitality is the rapid expansion of employment in a group of high technology industries, the proximity of these firms to institutions of higher learning and the availability of a fairly skilled work force. The outlook is for continued rapid growth in this sector. Even if the most conservative estimates of growth in the high-technology sector prove true, the current shortages among key engineering and technical personnel cannot afford to be ignored. Clearly, the need for documenting the type and intensity of occupational demand in this and several other segments of the state's economy such as the machinery and health-related fields are of vital importance for labor market planning and policy decisions.

An ongoing series of job vacancy data would be of great value in forecasting occupational needs and manpower shortages. It is a leading indicator of economic activity and the tightness of labor markets. Job vacancy data can be utilized to identify the types of unemployment, to more effectively target training and educational resources, to provide vocational guidance at all occupational levels, to assist workers in finding employment, to allow employers to improve their planning process, and to set a framework for the matching of jobseekers with unmet employer needs.

Our experience with the JOS in Massachusetts has shown that estimates on the level and rate of current job openings by occupation can provide us with a measure of total unmet demand in specific occupational groups. We recommend a substantial increase in the sample size in order that significant changes from survey to survey can be analyzed. This, in turn would provide us with a statistical trend series that, together with other indicators of demand and supply (e.g. employment, unemployment, the insured unemployed, new hires, Job Bank orders, OES projections, and vocational education and CETA completions) would provide a powerful tool for labor market analysis. Most importantly, the larger sample size would also enable us to provide job openings estimates for more occupational groups and at a much finer level of occupational detail. A larger sample would also provide us with more complete information on hard-to-fill jobs, part-time jobs and jobs with future starting dates.

At the industry level, the expanded sample could produce estimates of job openings at a finer level of manufacturing detail. In Massachusetts, the durable goods industries include most of the high technology industries that are contributing greatly to the health of our economy, while the non-durable goods sector represents many of our stagnant or declining industries. Both the growing and declining sectors of manufacturing have special manpower needs that can be better addressed by the addition of job vacancy statistics to our present knowledge of labor market conditions.

In conjunction with the expansion of the sample size, we also recommend a major effort to obtain a supplementary up-to-date list of new firms from which to draw the sample. Such a list of newly created firms would reduce certain biases inherent in the current survey.

APPENDIX

A. Sample Selection

The scope of the JOS survey includes all job vacancies that took place in Massachusetts on March 31, June 30, and September 30, 1979 within establishments in the sample frame. The base from which the sample was selected was the list of employers covered by the state Unemployment Insurance (UI) program for the first quarter of 1978. Units classified in SIC's for agriculture and private households, as well as all units in government, are excluded. A probability sample of about 1,200 establishments was selected from the UI files. The sample was stratified by industry, location and employment size. Replacement (shadow) units were also selected for use if the original establishment refused to participate in the survey, went out of business or would not otherwise produce useable data. Not all units, however, have shadows. Some are unique and some strata do not have a sufficient number of establishments to provide a replacement for all original units.

B. The Survey Questionnaire

Job vacancy data in the first three rounds of the survey was collected by means of two basic schedules mailed to establishments, a long structured and short structured form. One of the objectives of the pilot Job Openings Survey was to test each type of schedule in combination with other variables such as method of collection and employment size of establishments. About half of the establishments received the short structured form which listed 70 occupations while the remainder of the sample received questionnaires with 146 occupations.

The fundamental questions asked on each type of schedule was the number and classification of openings on the reference dates including part-time openings and openings unfilled for thirty days or more. In addition, the schedule asked for openings with future starting dates and the number of people employed in the pay period which includes the 12th day of the month.

An analysis of the response between the long and short structured schedules used in the first three rounds of the JOS revealed no significant differences in the quality or frequency of response. The compilation of data is limited to the format in the short structured schedule (see attached schedule).

C. Response Rates

Table 22 presents the useable response rates achieved in the first three rounds of the Job Openings Survey together with the number of and reasons for non-response. If the out-of-business and non-mailable categories were eliminated from the total, useable response would have been 83 percent, 88 percent, and 86 percent respectively.

Table 23 presents the number of useable responses for the three surveys by nine different employer size classes.

TABLE 22 DISTRIBUTION OF SAMPLE BY RESPONSE OR NON-RESPONSE
REFERENCE DATES MARCH 31, JUNE 30, AND SEPTEMBER 30, 1979

	MARCH		JUNE		SEPTEMBER	
	NO.	PERCENT	NO.	PERCENT	NO.	PERCENT
TOTAL	1233	100	1201	100	1172	100
Usable	961	78	1034	86	989	85
No Response	135	11	107	9	98	8
Refusal	46	4	16	1	61	5
Out of Business	75	6	19	2	14	1
Unusable Data	13	1	17	1	6	1
Out of Scope	1	0 *	0	0	1	0 *
Non-Mailable	2	0 *	8	1	3	0 *

* less than 1 percent

TABLE 23 USABLE RESPONSE BY EMPLOYER SIZE CLASS
Reference Dates, March 31, June 30, and September 30, 1979

SIZE CLASS	NUMBER EMPLOYEES	3-SURVEY		MARCH		JUNE		SEPTEMBER	
		No.	Percent	No.	Percent	No.	Percent	No.	Percent
TOTAL		2984	100	961	100	1034	100	989	100
1	(1-3)	248	8	88	9	89	8	71	7
2	(4-9)	348	12	97	10	115	11	136	14
3	(10-19)	334	11	127	13	114	11	93	9
4	(20-49)	429	15	117	12	152	15	160	16
5	(50-99)	367	12	121	13	126	12	120	12
6	(100-249)	365	12	116	12	116	11	133	14
7	(250-499)	308	10	95	10	112	11	101	10
8	(500-999)	291	10	96	10	110	11	85	9
9	(1000 +)	294	10	104	11	100	10	90	9

D. Methods of Collection

The following tables (24, 25, and 26) provide detailed data on response by method of collection and employment size of establishment for the three JOS surveys. Response was obtained by mail, telephone, and personal visit and was broken out by nine size classes.

TABLE 24 DISTRIBUTION OF RESPONSES BY METHOD OF COLLECTION

Reference Date, March 31, June 30, and September 30, 1979

	MARCH		JUNE		SEPTEMBER	
	NO.	PERCENT	NO.	PERCENT	NO.	PERCENT
TOTAL	961	100	1034	100	989	100
Mail	393	41	620	60	572	58
Telephone	358	37	367	35	417	42
Personal Visit	210	22	47	5	0	0

TABLE 25 USABLE RESPONSE BY EMPLOYER SIZE CLASS

AND BY METHOD OF COLLECTION

Reference Date, March 31, June 30, and September 30, 1979

		MARCH				JUNE				SEPTEMBER			
SIZE CLASS	NUMBER EMPLOYEES	TOTAL	MAIL	PHONE	VISIT	TOTAL	MAIL	PHONE	VISIT	TOTAL	MAIL	PHONE	VISIT
1	1-3	100	42	47	11	100	53	47	0	100	54	46	0
2	4-9	100	29	62	9	100	46	52	2	100	50	50	0
3	10-19	100	44	46	10	100	48	51	1	100	47	53	0
4	20-49	100	36	57	7	100	51	49	0	100	51	49	0
5	50-99	100	37	56	7	100	51	48	1	100	51	49	0
6	100-249	100	43	34	23	100	65	27	8	100	58	42	0
7	250-499	100	50	18	32	100	73	21	6	100	61	39	0
8	500-999	100	48	6	46	100	77	12	11	100	78	22	0
9	1000 and over	100	40	2	58	100	80	6	14	100	82	18	0

TABLE 26 USABLE RESPONSE BY EMPLOYER SIZE CLASS AND BY METHOD OF COLLECTION

Reference Date, March 31, June 30, and September 30, 1979

(A) Size Class 1 (1-3 Employees)

MONTH	TOTAL RESPONSE		MAIL		PHONE		VISIT	
1979	No.	Percent	No.	Percent	No.	Percent	No.	Percent
TOTAL	248	100	122	49	116	47	10	4
MARCH	88	100	37	42	41	47	10	11
JUNE	89	100	47	53	42	47	0	0
SEPTEMBER	71	100	38	54	33	46	0	0
AVERAGE	82	100	41	49	38	47	3	4

(B) Size Class 2 (4-9 Employees)

MONTH	TOTAL RESPONSE	MAIL		PHONE		VISIT	
1979	No.	No.	Percent	No.	Percent	No.	Percent
MARCH	97	28	29	60	62	9	9
JUNE	115	53	46	60	52	2	2
SEPTEMBER	136	68	50	68	50	0	0
TOTAL	348	149	43	188	54	11	3

(C) Size Class 3 (10-19 Employees)

MONTH	TOTAL RESPONSE	MAIL		PHONE		VISIT	
1979	No.	No.	Percent	No.	Percent	No.	Percent
MARCH	127	56	44	58	46	13	10
JUNE	114	55	48	58	51	1	1
SEPTEMBER	93	44	47	49	53	0	0
TOTAL	334	155	47	165	49	14	4

TABLE 26 USABLE RESPONSE BY EMPLOYER SIZE CLASS AND BY METHOD OF COLLECTION

(D) Size Class 4 (20-49 Employees)

MONTH	TOTAL RESPONSE	MAIL		PHONE		VISIT	
1979	No.	No.	Percent	No.	Percent	No.	Percent
MARCH	117	42	36	67	57	8	7
JUNE	152	78	51	74	49	0	0
SEPTEMBER	160	82	51	78	49	0	0
TOTAL	429	202	47	219	51	8	2

(E) Size Class 5 (50-99 Employees)

MONTH	TOTAL RESPONSE	MAIL		PHONE		VISIT	
1979	No.	No.	Percent	No.	Percent	No.	Percent
MARCH	121	44	37	68	56	9	7
JUNE	126	64	51	60	48	2	1
SEPTEMBER	120	61	51	59	49	0	0
TOTAL	367	169	46	187	51	11	3

(F) Size Class 6 (100-249 Employees)

MONTH	TOTAL RESPONSE	MAIL		PHONE		VISIT	
1979	No.	No.	Percent	No.	Percent	No.	Percent
MARCH	116	50	43	39	34	27	23
JUNE	116	76	65	31	27	9	8
SEPTEMBER	133	77	58	56	42	0	0
TOTAL	367	169	46	187	51	11	3

TABLE 26 USABLE RESPONSE BY EMPLOYER SIZE CLASS AND BY METHOD OF COLLECTION

(G) Size Class 7 (250-499 Employees)

MONTH	TOTAL RESPONSE	MAIL		PHONE		VISIT	
1979	No.	No.	Percent	No.	Percent	No.	Percent
MARCH	95	48	50	17	18	30	32
JUNE	112	82	73	23	21	7	6
SEPTEMBER	101	62	61	39	39	0	0
TOTAL	308	192	62	79	26	37	12

(H) Size Class 8 (500-999 Employees)

MONTH	TOTAL RESPONSE	MAIL		PHONE		VISIT	
1979	No.	No.	Percent	No.	Percent	No.	Percent
MARCH	96	46	48	6	6	44	46
JUNE	110	85	77	13	12	12	11
SEPTEMBER	85	66	78	19	22	0	0
TOTAL	291	197	68	38	13	56	19

(I) Size Class 9 (1000 + Employees)

MONTH	TOTAL RESPONSE	MAIL		PHONE		VISIT	
1979	No.	No.	Percent	No.	Percent	No.	Percent
MARCH	104	42	40	2	2	60	58
JUNE	100	80	80	6	6	14	14
SEPTEMBER	90	74	82	16	18	0	0
TOTAL	294	196	67	24	8	74	25

As indicated in table 24, personal visits to firms were primarily used in the first survey round in March 1979 when 210 or 22 percent of the useable responses were accomplished by means of personal visit to sample establishments. The main purpose of the visits in the first round was to follow-up on non-respondents. The number of personal visits shrunk to 47 (5 percent) in the June 1979 survey and to zero in the September 1979 survey. It is apparent that personal visits are not essential for a high response from employers since the useable response rate actually increased from 78 percent in March to 86 percent in June and 85 percent in September. However, it is our opinion that the reason for the improved response in the second and third rounds were employer familiarity with the schedules, intensive phone follow-up and collection of data, and the much higher incidence of out-of-business establishments in the March survey.

E. Calculation of Vacancy Rates

Job vacancy rates were calculated by dividing the number of Job Openings by the sum of Employment and Job Openings (JV rate = $\frac{JO}{E+JO}$). The job vacancy rate can be misleading in some cases. An occupational group like secretary and stenographer will tend to have a lower job vacancy rate because of its high employment base (80,380). In this case the fact that the job vacancy rate is even slightly higher than the overall rate (3.3 percent vs. 3.1 percent) is significant.

F. Source of Occupational Employment Estimates

1979 Occupational employment was estimated as follows:

1. The 1976 OES survey-based matrix was used as a base figure for most occupational groups. (For a few occupational groups the 1976 census-based matrix was considered more reliable).
2. Occupational employment from the survey-based matrix was adjusted by three times the annual 1976-1985 growth rate from the Industry/Occupation projections program.
3. Census codes from the projections had to be converted to OES codes before the three-year percentage adjustment could be applied.
4. The estimated 1979 occupational employment was adjusted from OES codes to SOC codes to assure comparability with the JOS openings.

G. Reliability of Data

The sampling errors between surveys are too large to conclude that the change in job openings by occupation between quarters is significant. Also, there were a few inconsistencies in the data from one survey to the next (non sampling error) that further preclude a valid comparison of changes in job openings between surveys. Thus, the results of the three surveys were averaged into one.[29] Data is only presented for the 40 out of 70 occupational job categories that met the designated publication criteria.

29/ Overlap of openings would be minimal. It would only involve June or September openings that were available for more than three months.

1. Average relative standard error less than 50%,
2. Relative standard error for at least two months under 50%,
3. Relative standard error for a least one month under 35%,
4. There was sufficient survey coverage for the occupational group.
5. If criteria 1-4 are met, but the relative standard error for any one month is 60 percent or over, an average of two surveys only was used for that occupational group. 30/

The job openings include virtually all private nonagricultural wage and salary job openings, therefore they do not include job openings that exist in government or agriculture.

The 70 occupational groups can be broken into five ranges of relative standard error:

		# Occupational Groups
I	under 20%	15
II	between 20% and 29.9%	12
III	between 30% and 39.9%	5
IV	between 40% and 49.9%	8
V	50% and over (unpublished)	23
VI	other unpublishable	7

Only categories I through IV were considered for analysis. An example is presented on how to view the relative standard error 31/for an occupational group.

The occupational group mechanical engineer had an estimated 662 job openings, a job vacancy rate of 7.0 percent and a standard error of 77 (12 percent). We can say with 68 percent confidence that the true number of job openings falls between plus or minus one standard error of 662 (plus or minus 77), or between 585 and 739. Thus, the job vacancy rate at a 68 percent confidence level falls between 6.3 percent and 7.8 percent. If a higher confidence level is desired, say 95 percent, we would go to two standard errors (plus or minus 154). Therefore, we say with 95 percent confidence that the true number of job openings falls between 431 and 893 and the true job vacancy rate falls between 4.7 percent and 9.3 percent.

30/ Three such occupational groups were accountants and auditors (March and June) bank tellers (March and June) and social scientists and urban planners (June and September).

31/ A computed average for the three surveys. It is really more reflective of the relative standard error from one individual survey. The true relative standard error for the average of the three surveys would be lower in the same way that the relative standard error for each of the parts is usually greater than that of the whole; e.g. the average relative standard error for nonmanufacturing was 11 percent while the relative standard error for the component industry segments ranged from a low of 14 percent (services) to a high of 63 percent (construction).

TABLE 27
OCCUPATIONAL GROUPS WITH UNPUBLISHABLE DATA BY REASON
1979

SOC	OCCUPATIONAL GROUPS WITH HIGH RELATIVE STANDARD ERRORS1/	RELATIVE STANDARD ERROR 2/
4683	Cashiers	.50
5130	Guards & Private Detectives	.60
4200	Insurance, Securities, Real Estate & Service Sales Occupations	.61
2302	Other Teachers	.69
6711	Automobile Mechanics	.72
5120	Police & Detectives, Public Service	.73
6402	Other Transportation & Material Moving Occupations	.76
6132	Electricians	.77
6415	Bus Drivers	.77
6416	Taxi Cab Drivers & Chauffeurs	.81
2000	Social Workers, Recreation Workers, & Religious Workers	.84
5110	Fire Fighting & Fire Prevention Occupations	.86
5231	Other Health Service Occupations	.88
6150	Plumbers, Pipefitters & Steam Fitters	.88
6002	Other Construction & Extractive Occupations	.89
6120	Carpenters & Related Workers	.94
8100	Construction Laborers	.95
2200	Teachers, Colleges & Universities	.97
5252	Cosmetologists & Related Occupations, Except Barbers	.98
6140	Painters, Paperhangers & Plasterers	.98
2602	Health Diagnosing & Treating Practitioners	.99
6110	Brickmasons & Stonemasons	1.00
5502	Agriculture & Forestry Occupations3/	1.00
	Occupational Groups with Insufficient Coverage	
2402	Vocational & Educational Counselors & Librarians	--
6757	Telephone Line Installers & Repairers	--
4652	Telephone Operators	--
2100	Lawyers & Judges	--
2320	Elementary School Teachers	--
2330	Secondary School Teachers	--
	Occupational Groups with Questionable Data	
4802	Other Office Equipment Operators	--

1/ Refer to appendix for Selection Criteria
2/ The Relative Standard Error is a computed average for the three surveys.
3/ Excludes employment in Agriculture and Forestry industries

H. Limitations of Sample

Although the sample of approximately 1,200 establishments randomly selected from the Division of Employment Security Unemployment Insurance files is fairly representative of the state's industry mix, there are a few limitations and problem areas within the sample that merit discussion.

The sample does not include government, agriculture, and private households. For this reason, occupations such as elementary and secondary school teacher, police and firefighter did not receive sufficient coverage and could not be properly presented.

Since the sample used in the JOS was derived from the state's UI files, it does not include newly created establishments. There is a considerable lag between the time a new company is formed and the time it reports to the Division of Employment Security (DES). There is a further lag between the time a firm reports its activities to the DES and when the information is included in the state's ES-202 system.32/ The first problem is particularly important because new firms often expand rapidly and have a significant number of job openings. This could result in an undercount of vacancies. In Massachusetts such an undercount is more likely to occur in the high technology industries where much of the growth in the state's economy is taking place. The possible underrepresentation of occupations in the high-technology industry is discussed in more detail elsewhere in this report.

I. Problem Areas

Reliable figures could not be gathered for college teachers and other faculty members because of a dual personnel organization typical of many colleges and universities. Personnel departments generally were informed about openings in the administrative branch of the school but were not cognizant of, or responsible for, the hiring of faculty members. We encountered similar difficulties in obtaining complete information on job openings in large hospitals because of decentralized recruiting and hiring practices. Different departments were responsible for hiring nurses and other hospital staff such as janitors or cafeteria workers. Generally, however, the Response Analysis Survey (RAS) in Massachusetts revealed that within most other large establishments, information about recruitment and hiring was generally available at a central location within the establishment.

Reliable figures also could not be gathered for the occupation of telephone operator. The chief employer of telephone operators in the state could not provide us with useable information on job openings because such information was aggregated on a regional level (New England) and data for Massachusetts could not be disaggregated. This type of problem was encountered by a few other multi-location firms.

32/ Data is available approximately five months after the end of each quarter.

Some additional units had to be added to the original sample to account for multi-reporters of the same SIC within a particular town. For example, a supermarket chain with 3 locations in the city of Worcester would be categorized as one establishment in the state's ES-202 system. Consequently, if three individual reports were received, all three units were included in the sample and then re-weighted into the appropriate size class.

Construction occupations are well represented in Table 27 because of the high relative standard error found in the openings data from the entire construction industry. Vacancies in the construction industry fluctuate widely because of the seasonal nature of the industry. The large number of small employers in the industry tend to produce erratic or unstable estimates because of their larger sampling ratio. This latter problem could also have an effect on the high relative standard error found in such occupational groups as taxi drivers and auto mechanics.

J. The Standard Occupational Classification System

The JOS utilizes the Standard Occupational Classification (SOC) system. The SOC was first published in 1977. It was developed to facilitate interrelations with other coding systems such as the Dictionary of Occupational Titles (DOT), Occupational Employment Statistics (OES), Census, and U.S. Office of Education (USOE), and to be a flexible and adaptable system that can be used at varying levels of detail. The DOT on a 3-digit-level was insufficient because it does not differentiate professional from technical occupational levels, while on the 9-digit level the 20,000 DOT codes are too detailed. The OES, on the other hand, with approximately 2,000 job classifications is too detailed in the production and maintenance occupations at the expense of other job categories, and does not have readily available definitions for all occupational titles.

The hierarchial structure of the SOC provides several levels of detail that make the system well suited for the purpose of describing and classifying occupations. For example, the two-digit code, 39, represents the major group technicians; except health, engineering, and science, while the three-digit minor group, 393, stands for programmers. The three-digit code serves as a cluster of the following three occupations and corresponding four-digit codes; 3931-business programmers, 3932 - scientific programmers, 3934 - numerical control tool programmers. Thus, the SOC provides 4 levels of aggregation with over 800 clearly defined occupational titles.

The JOS utilizes a combination of two, three, and four digit SOC's. The short structured schedule listed 70 occupational categories while the long structured schedule included 146. It is the clarity of definitions, the flexibility in aggregation, and the comparability with the data systems that make the SOC suitable for the Job Openings Survey.

K. Selected Job Descriptions and Requirements

ELECTRICAL ENGINEERS

Electrical engineers participate in every phase of the development of electrical components. This includes the designing, developing and testing of electrical equipment such as motors, generators, and the wiring of autos and buildings. Generally, an electrical engineer will concentrate in a specific field such as communications, computers, integrated circuits, electrical equipment, manufacturing, or power distributing equipment. In nearly all cases a bachelors degree in engineering is needed to enter this field.

MECHANICAL ENGINEERS

The main objective of a mechanical engineer is to design a machine that produces power. This is accomplished by developing different types of engines and machines that vary from propelling jets to cooling refrigerators. Aspects of this work range from design, to sales, to teaching. A four year college program majoring in engineering is a general entry requirement for a job in engineering. Although some entry level jobs may be obtained by a two-year program applicant, higher level jobs may require some graduate work.

SYSTEMS ANALYSTS

The occupation systems analyst involves the designing or alteration of a computer system that will best process and produce data that a company requires. Once a system is devised the analyst determines whether the data needs of the system match up with the computer capabilities. Since the data involved is complex and varied, a systems analyst will specialize in business, science or engineering. There are no universally used requirements for a systems analyst, but a college degree is almost always needed. Backgrounds in different fields are needed such as accounting if the data is business oriented or math and science if data is related to engineering. A bachelors degree in computers is a growing requirement.

COMPUTER PROGRAMMERS

A computer programmer's goal is to extract data from the computer for management, engineering, or scientific uses. In order to obtain this information from the computer, the programmer must give the computer a step-by-step set of instructions so it can retrieve the data requested. The majority of computer programmers do have a college degree but this requirement varies with the company's needs. Sometimes a formal course in programming is needed as the programmer moves up the company ladder and the programming becomes more involved.

ELECTRONIC TECHNICIANS

Electronic technicians work with engineers to research and develop experimental and electronic models. They are also involved in the repair of electrical applicances and assembly work. The majority of electronic technicians enter the occupation through private technical school or the armed forces.

REGISTERED NURSES

The duties of a registered nurse include observation, analysis, and the treatment of patients with medication. There are several areas that nurses work in such as hospitals, private homes, and community health centers. They may also work in doctors' offices, private industry and as teachers in nursing schools. A license is needed to be employed as a nurse in all states. To receive a license a nurse must have graduated from a state approved school of nursing and pass a final written examination.

LICENSED PRACTICAL NURSE

A licensed pratical nurse is responsible for the care of physically and emotionally ill patients. (The duties of a LPN requires some of the professional training a registered nurse receives). They act as an assistant to the doctor and registered nurse by recording temperatures, administering medication, and catering to the personal needs of patients. To enter this field an applicant must have been licensed by the state. This is accomplished by graduating from an accredited nursing program and passing a written examination.

NURSING AIDES, ORDERLIES, AND ATTENDANTS

Orderlies and related occupations are usually assigned to the more unskilled duties that a nurse is too busy to attend to. Most of these duties involve the personal care of patients, such as feeding, bathing, and dressing the patients. Other work such as making beds, transporting patients, and stacking supply rooms are also required. Since most of the training in this occupation is on the job, some hospitals only require that applicants have a high school education, while still others will overlook education. In general, there are a minimum of qualifications.

HEALTH THERAPISTS

Health therapists participate in the rehabilitation of physically or mentally disabled people. Physical therapy involves exercising and treating physically disabled patients so they can strengthen their muscles and coordination. Occupational therapists work with emotionally disturbed patients to build up their self confidence. A physical therapist must obtain a license to practice their profession. To qualify for a license an applicant must have received a degree at an accredited physical therapy program and pass a state issued exam. The completion of a bachelors degree in occupational therapy is needed along with passing a state examination to become a registered occupational therapist.

DIETICIANS

The occupation dietician involves the planning of well balanced meals that aid in the recovery of patients to good health and the maintenance of health in others. There are several fields that a dietician can delve into. These fields include administration of food plans for large institutions such as schools. Clinical dieticians devise menus for hospitals, along with research dieticians who search for ways to improve both healthy and sick peoples' nutrition. A bachelors degree that includes a major in foods and nutrition or institution management is required to enter this occupational field.

SECRETARIES

Secretaries are at the center of communication within their place of work. They process and transmit information both internally and externally. This communication is achieved through typing, shorthand, answering telephones, and filing. Workers in this field also can specialize as a legal, medical, technical, school or social secretary. For these specialized areas, training is available in schools and community and junior colleges.

TYPISTS

The major duty of a typist involves typing up hand written drafts into neatly organized documents. Other responsibilities include filing, answering telephones and operating office machines. In the majority of cases a high school diploma is required combined with good grammatical skills.

DATA TYPISTS

Data typists use special machines that convert the information they type to holes in cards or magnetic impulses on tapes or discs. The user often sits at a machine equipped with a typewriter keyboard and an electronic screen that displays the data as it is entered directly into the computer. To enter this field some private training is necessary. Training can be obtained in high school, vocational school, or specialized private computer school.

MACHINIST

The machinist occupation involves shaping various types of metals into machine parts and tools. This is accomplished by cutting, boring, and filing different metals into the required dimensions. A machinist must have vast knowledge of all metals, must strive for precision, and must be mechanically inclined. It is also helpful for a prospective candidate to concentrate on mathematics and the sciences in high school.

TOOL AND DIE MAKERS

Tool and die makers are highly skilled craftsmen who design and produce tools and other devices used in mass production. Examples of such tools are molds, gauges and jigs. Like machinists, tool and die makers must have full knowledge of all metals and be mechanically inclined. Although a four year formal apprenticeship is the major route to this career, vocational school is emerging as an alternative way to develop the necessary skills.

WELDERS

The function of a welder is to join together two pieces of metal by the use of heat. There are several types of ways to produce the heat needed to create fusion of the two parts. Arc welding is widely used along with resistance welding and gas welding. Jobs in welding can range from a highly skilled manual welder who creates objects from plans to a low-skilled welder who presses a button to start the welding machine. Skilled welders usually work on the construction of boats, maintenance of metal objects and the connection of pipes. Low-skilled welding is usually learned on the job in a few hours, while it takes a high-skilled welder several years. Although welders learn their trade on the job, most companies require applicants to have studied welding in high school or a trade school.

ASSEMBLERS

Assemblers construct an item by putting together related parts. In most cases an assembler is a specialist at one process of the construction. Many assemblers stand in one spot and attach a part to the unfinished product as it moves by. Other assemblers known as bench assemblers do more delicate work. Some make subassemblies by constructing a part of the final product, while others make entire products. Still another type is the floor assemblers, who as part of a group will put together large equipment or machinery such as school busses. Assemblers usually receive on-the-job training, in which a supervisor or fellow employee will observe the new worker for a few days. For some type of assembly jobs, applicants may have to meet special requirements.

COOKS AND CHEFS

The duties of a cook depends entirely on the status and size of a restaurant. Responsibilities vary from a short order cook who spends most of his/her time preparing sandwiches and scrambling eggs to a chef who is employed in an exotic restaurant and specializes in one process in putting together a meal. There are several ways to gain entrance in this profession. The most frequent route is to start as a cook's helper and work your way up. However, new avenues are becomming popular, such as learning the trade in a vocational school or a 3-year apprenticeship program offered by certain trade unions. Once again, qualifications will usually depend on the type of restaurant in which one is seeking employment.

SOURCE: Occupational Outlook Handbook, 1980-81, U. S. Department of Labor,
Bureau of Labor Statistics

Appendix L Short Structured Questionnaire

Bureau of Labor Statistics
Quarterly Report on Job Openings
March 1979–A1

Commonwealth of Massachusetts

in Cooperation with the U.S. Department of Labor

The information collected on this form by the Bureau of Labor Statistics and the State agencies cooperating in its statistical programs will be held in confidence and will be used for statistical purposes only.

This report is authorized by law 29 U.S.C. 2. Your voluntary cooperation is needed to make the results of this survey comprehensive, accurate, and timely.

Form Approved
O.M.B. No. 44-R1064

I. Employment

Total Employment ☐ Enter the total number of persons on the payrolls of the establishments covered in this report who worked full- or part-time for any part of the pay period which includes the 12th of **March 1979**. This figure should equal the total employment figure on the monthly labor turnover schedule (DL 1219).

Include salaried officers of corporations, executives and their staffs, and employees engaged in force-account construction but exclude proprietors, members of unincorporated firms, and unpaid family workers. *Include* persons on vacations and sick leave if they received pay directly from your firm for the pay period covered.

Exclude persons on leave without company pay the entire period and pensioners and members of the Armed Forces carried on the rolls but not working during the pay period covered.

Address Label

Job Vacancy Survey
Job Market Research Services
Division of Employment Security
C.F. Hurley Building
Government Center
Boston, Massachusetts 02114

If questions arise concerning your report, whom should we contact?

Name	Title	City & State	Telephone	Date

BLS 3115.1 (January 1979)

II. Job Openings by Occupation

Reporting Instructions

Period Covered—Job openings information should be reported as of the close of the last business day of the month of **March 1979**.

Column 1. Number of Current Job Openings (Vacancies)—Enter the number of current job openings. A current job opening is an existing vacant job that is immediately available for filling and for which your firm is actively trying to find or recruit someone from outside your firm (i.e., a "new" worker—not a company employee).

"Actively trying to find or recruit" means current efforts to fill the job opening through such means as orders listed with public or private employment agencies and school placement offices; "help wanted" advertising (newspaper, posted notice, etc.); recruitment programs; interview and selection of applicants.

Include openings for all positions and classifications whether full-time, part-time, permanent, or temporary. Also, include orders with employment agencies and notifications to unions.

Exclude jobs to be filled by recall, transfer, promotion, demotion, or return from paid or unpaid leave; jobs unoccupied because of labor-management disputes; job openings for which "new" workers were already hired and scheduled to start work later; and the "openings with future starting dates" reported in column 4.

Column 2. Current Job Openings Remaining Unfilled for a Month or Longer—
Enter number of current job openings included in column 1 which have remained unfilled for a month or longer.

Column 3. Current Job Openings that are for Part-Time Positions—Enter the number of current job openings included in column 1 that are for positions expected to provide less than 35 hours of work a week.

Column 4. Number of Openings with Future Starting Dates—Enter the number of openings for which your firm is actively trying to find or recruit someone from outside your firm (i.e., a "new" worker), but which relate to jobs that are currently occupied or unavailable for immediate occupancy for such reasons as: job unavailable until the present incumbent leaves; work will not start until a future date; new branch to be opened or anticipated increase in business.

NOTE: **Openings with future starting dates are not to be included in column 1.**

Totals. Enter the column totals. If the column total is zero, enter "0."

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Occupations and Definitions	Office Use Only	Current Job Openings (ready for Immediate filling) Total Current Job Openings (1)	Included in Col. 1, Unfilled a Month or Longer (2)	Included in Col. 1 for Part-time Positions (3)	Job Openings with Future Starting Dates (not Included in Col. 1) (4)
EXECUTIVE, ADMINISTRATIVE AND MANAGERIAL This group includes top and middle management occupations and occupations directly supportive to management which are concerned with achieving the overall objectives of an industrial, commercial, governmental or other establishment. Top level managers include persons concerned with policy making, planning, staffing, directing and/or controlling activities that are common to many types of organizations, usually through subordinates and/or professional/technical management support personnel. Middle managers include persons who plan, or organize, staff, direct and/or control activities at the operational level, usually through subordinates who directly supervise the activities of the establishment's work force. Exclude farm managers, trade managers, and sales managers of small-scale establishments.					
ACCOUNTANTS AND AUDITORS Includes occupations involving examining, analyzing, and interpreting accounting records for the purpose of giving advice or preparing statements, and installing or advising on systems of recording costs or other financial and budgetary data.	1412				
OTHER EXECUTIVE, ADMINISTRATIVE, AND MANAGERIAL OCCUPATIONS (GENERAL MANAGER; FINANCIAL MANAGER; PERSONNEL AND INDUSTRIAL RELATIONS MANAGER; ETC.) Includes all other top and middle management occupations.	1102				
ENGINEERS, ARCHITECTS, AND SURVEYORS This group includes occupations concerned with the application of fundamental architectural and engineering principles in the design and construction of buildings, equipment and processing systems, highways and roads, and utilization of land areas.					
CIVIL ENGINEERS (CONSTRUCTION ENGINEER; SANITARY ENGINEER; STRUCTURAL ENGINEER; ETC.) Includes occupations involving planning, designing, and overseeing construction and maintenance of stationary structures and facilities. Includes conducting research, and advising on engineering problems, designing projects and structures such as bridges, dams, roads, railroads, irrigation projects, pipelines, water sewage systems, and waste disposal systems.	1628				
ELECTRICAL AND ELECTRONIC ENGINEERS (ELECTRICAL RESEARCH ENGINEER; ELECTRICAL AND ELECTRONICS PRODUCTS SALES-ENGINEER; ETC.) Includes occupations involving designing, planning, and overseeing manufacture, construction, installation, operation, and maintenance of electric or electronic components, equipment, systems, facilities, and machinery used in generation, transmission, distribution, and utilization of electrical energy for household, commercial, or industrial consumption. Includes conducting research and development concerned with design and manufacture of vacuum and gaseous tubes, semi-conductor and other solid-state devices, and electronic equipment, and their application to commercial, industrial, military, scientific, and medical equipment, processes, and problems.	1633				

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MECHANICAL ENGINEERS (AUTOMOTIVE ENGINEER; TOOL DESIGNER; PLANT ENGINEER; MECHANICAL EQUIPMENT SALES ENGINEER; ETC.) Includes occupations involving the application of the principles of physics and engineering in the planning and design of tools, and engines, machines, and other mechanically functioning equipment; and overseeing installation, operation, maintenance, and repair of such equipment, including centralized heat, gas, water, and steam systems.	1835				
OTHER ENGINEERS AND ARCHITECTS (AEROSPACE ENGINEER; METALLURGICAL AND MATERIALS ENGINEER; MINING ENGINEER; PETROLEUM ENGINEER; CHEMICAL ENGINEER; NUCLEAR ENGINEER; COMPUTER ENGINEER; SURVEYORS; ETC.) Includes all other occupations concerned with the application of fundamental architectural and engineering principles in the design and construction of buildings, equipment and processing systems, highways and roads, end utilization of land areas.	1802				
NATURAL SCIENTISTS, MATHEMATICIANS, COMPUTER SCIENTISTS, AND OPERATIONS RESEARCHERS This group includes occupations concerned with the application of scientific and mathematical knowledge to the conduct of research and development and related activities. Exclude teachers of the individual subjects.					
COMPUTER, MATHEMATICAL, AND OPERATIONS RESEARCH OCCUPATIONS (COMPUTER SYSTEMS ANALYST; OPERATIONS RESEARCH ANALYST; MATHEMATICIAN; STATISTICIAN; ETC.) Includes occupations concerned with the application of mathematical knowledge to the conduct of research and development and related activities, including utilization of the computer.	1700				
NATURAL SCIENTISTS (PHYSICIST; CHEMIST; GEOLOGIST; ETC.) Includes occupations concerned with the application of scientific knowledge to the conduct of research and development and related activities.	1800				
SOCIAL SCIENTISTS, SOCIAL WORKERS, RELIGIOUS WORKERS AND LAWYERS This group includes occupations concerned with the social needs of people and in basic and applied research in the social sciences.					
SOCIAL SCIENTISTS AND URBAN PLANNERS (ECONOMIST; PSYCHOLOGIST; ETC.) Includes occupations concerned with human society and its characteristic elements, such as origin, race, or state; with economic and social relations and institutions involved in man's existence as a member of an organized community. Includes occupations involving developing comprehensive plans and programs for existence as a member of an organized community. Includes occupations involving developing comprehensive plans and programs for utilization of land and physical facilities of cities, counties, and metropolitan areas.	1900				

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SOCIAL WORKERS, RECREATION WORKERS, AND RELIGIOUS WORKERS (RECREATION WORKER; PAROLE OFFICER; CLERGY; ETC.) Includes occupations involving counseling and giving aid to individuals and families requiring assistance of social service agencies, including visiting clients and arranging for care in foster homes, half-way houses or other facilities. Also, includes occupations involving organizing and supervising social, recreational and cultural activities in youth or family camps, community centers, playgrounds, and other settings. Includes conducting recreation activities with assigned groups in public or voluntary agency. Also, includes occupations concerned with providing spiritual and moral guidance and counseling to members of a religious faith or denomination and others, expounding religious doctrine and performing other activities associated with the practice of religions.	2000				
LAWYERS AND JUDGES Includes occupations concerned with the application of principles related to statute law and its administration. Includes presiding over judicial procedings, conducting litigation, drawing up legal documents, giving advice and performing other legal functions.	2100				
TEACHERS, LIBRARIANS, AND COUNSELORS This group includes occupations concerned with direct contact with individuals to provide for their educational institution, but excludes instructors who provide on-the-job training. Included are librarians, archivists, curators, and educational and vocational counselors. These occupations frequently require a certificate for which a bachelor's degree is the usual minimum requirement.					
TEACHERS, COLLEGES, AND UNIVERSITIES Includes occupations concerned with conducting classes for students in colleges and universities. Teaches one or more subjects within a prescribed curriculum. May be designated by academic rank such as Professor, Associate or Assistant Professor or Instructor. May teach in a two year college or technical institute. This occupation includes preparing and delivering lectures to students; conducting seminars or laboratory sessions; stimulating and guiding class discussions; preparing and administering examinations and grading answer papers; assigning and making essays; directing research programs of graduate students; serving on faculty committees concerned with such matters as curriculum revision, academic planning and degree requirements; advising students on academic and other matters; assisting students with the conduct of various scholarly, cultural and political clubs or societies; and providing professional services to the community in area of specialization. Include coaches and physical education teachers.	2200				
ELEMENTARY SCHOOL TEACHERS Includes occupations involving teaching primary subjects and elements of social behavior to elementary school pupils.	2320				
SECONDARY SCHOOL TEACHERS Includes occupations involving instructing students in one or more academic or vocational subjects, such as English, mathematics, machine shop, computer programming, or social studies, in private, religious, or public secondary schools (high school).	2330				

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OTHER TEACHERS (ADULT EDUCATION TEACHER; SPECIAL EDUCATION TEACHER; PARK NATURALIST; KINDERGARTEN TEACHER; ETC.) Includes all other occupations concerned with teaching in kindergarten and post-secondary schools, including schools for exceptional or handicapped persons and in business, and government.	2302				
VOCATIONAL AND EDUCATIONAL COUNSELORS AND LIBRARIANS, ARCHIVISTS, AND CURATORS (RESIDENCE COUNCILOR; INSTITUTION LIBRARIAN; MUSEUM TECHNICIAN; ETC.) Includes occupations involving counseling individuals and groups on educational and vocational matters. Includes assisting students or workers in self-understanding, self-development, and career planning by presenting educational and occupational information. Also, includes occupations concerned with library and archival sciences, including public and private libraries and archives, and with maintaining museums, galleries, and related exhibits.	2402				
HEALTH DIAGNOSING AND TREATING PRACTITIONERS (PHYSICIAN; DENTIST; VETERINARIAN; OPTOMETRIST; PODIATRIST; CHIROPRACTOR; ETC.) This group includes occupations concerned with preventing and diagnosing human and animal ailments, and prescribing and giving medical and surgical treatment for diseases and illnesses. These practitioners generally work independently of other medical specialists, rather than under their supervision. However, they may consult with other workers in this group.	2602				
REGISTERED NURSES, PHARMACISTS, DIETITIANS, THERAPISTS, AND PHYSICIAN'S ASSISTANTS This group includes occupations concerned with the maintenance of health, the prevention of illness and the care of the ill through the provision and supervision of nursing care; compounding drugs; planning food service or nutritional programs; providing assistance to physicians; and the provison of therapy and treatment as directed by physicians.					
REGISTERED NURSES (NURSE PRACTITIONER; NURSE SUPERVISOR; GENERAL DUTY NURSE; PRIVATE DUTY NURSE; ETC.) Includes occupations involving the planning, delivery, and evaluation of nursing care and a wide variety of nursing services including health maintenance and the prevention of illness, and treatment of illness under a physicians's instructions.	2900				
PHARMACISTS, DIETITIANS, THERAPISTS AND PHYSICIAN'S ASSISTANT Includes occupations concerned with compounding drugs; providing technical health services to assist physicians and dentists; planning food service or nutritional programs; and giving health treatments.	3000				
WRITERS, EDITORS, ARTISTS, ENTERTAINERS, AND ATHLETES (AUTHOR; REPORTER; PUBLICITY WRITER; DESIGNER; MUSICIAN; COMPOSER; ACTOR; DIRECTOR; CRAFT-ARTIST; PHOTOGRAPHER; DANCER; ETC.) This group includes occupations concerned with creating, performing, and conducting literary, artistic, entertaining, and sporting activities and works.	3202				

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HEALTH TECHNOLOGISTS AND TECHNICIANS This group includes occupations concerned with providing technical assistance in the provision of health care.					
LICENSED PRACTICAL NURSES Includes occupations involving caring for ill, injured, convalescent, and handicapped persons in hospitals, clinics, private homes, and similar institutions.	3660				
OTHER HEALTH TECHNOLOGISTS AND TECHNICIANS (CLINICAL LABORATORY TECHNICIAN; DENTAL HYGENIST; HEALTH RECORD TECHNICIAN; RADIOLOGIC TECHNICIAN; ETC.) Includes all other occupations concerned with carrying out technological and technical functions in a medical specialization to obtain data for use in diagnosis, treatment and control of diseases, using knowledge of scientific and mathematical principles and medical laboratory practices.	3602				
TECHNOLOGISTS AND TECHNICIANS, *EXCEPT* HEALTH This group includes occupations concerned with providing technical assistance in engineering and scientific research, development, testing, and related activities as well as independently operating and programing technical equipment and systems.					
PROGRAMMERS (BUSINESS PROGRAMMER; SCIENTIFIC PROGRAMMER; NUMERICAL CONTROL TOOL PROGRAMMER; ETC.) Includes occupations concerned with converting statement of problem to detailed flow charts and/or coding into computer language and solution by automatic data processing equipment; and selecting symbols from coding system appropriate to make or model of digital computer for application to completed program for conversion to machine processable instructions.	3930				
OTHER TECHNOLOGISTS AND TECHNICIANS, *EXCEPT* HEALTH (ENGINEERING TECHNICIAN; DRAFTER; SURVEYING TECHNICIAN; SCIENTIFIC TECHNICIAN; LEGAL TECHNICIAN; RADIO OPERATOR; ETC.) Includes all other occupations concerned with performing technical tasks, except in the field of health.	3902				
MARKETING AND SALES OCCUPATIONS This group includes occupations concerned with selling goods and services, purchasing commodities and property for resale and with conducting wholesale and retail businesses on own or owner's behalf or in partnership. Managing supervisors of individual chain stores and of departments in stores are included in this division. Managers who direct activities of sales departments of large organizations are classified in managerial occupations.					

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SALES OCCUPATIONS, COMMODITIES (TECHNICAL SALES WORKER; SALES REPRESENTATIVE, SALES CLERK; ETC.) Includes occupations concerned with conducting wholesale and retail businesses which sell commodities on own or owner's behalf or in partnership; supervising and coordinating activities of workers directly and indirectly engaged in selling commodities; selling machinery and equipment and providing technical information about their composition, utilization and maintenance; selling products of manufacturers to wholesale and retail establishments; selling commodities on a wholesale basis usually in a specific geographic area; and selling and demonstrating commodities in wholesale and retail establishments and homes, on the street, and from door to door.	4100				
INSURANCE, SECURITIES, REAL ESTATE, AND SERVICE SALES OCCUPATIONS (BUSINESS SERVICES SALES WORKER; ADVERTISING SALES WORKER; ART SALES WORKER; ETC.) Includes occupations concerned with selling various types of insurance; selling and leasing real estate; buying and selling securities; and selling advertising and business services.	4200				
OTHER MARKETING AND SALES OCCUPATIONS (SALES SUPERVISOR; BUYER; APPRAISER; DEMONSTRATOR; MODEL; ETC.) Includes all other occupations concerned with wholesale or retail trade businesses on own or on owner's behalf or in partnership; supervising and coordinating activities of workers directly or indirectly engaged in other sales occupations; buying commodities for resale in wholesale or retail trade; driving vehicles on established routes to deliver laundry and dry cleaning; selling, renting, and demonstrating goods or services; and appraising commodities.	4302				
CLERICAL OCCUPATIONS This group includes occupations concerned with preparing, transcribing, transferring, systematizing, and preserving written communications and records; collecting accounts; gathering and distributing information; operating office machines and electronic data-processing equipment; storing, distributing, and accounting for stores of materials; operating telephone switchboards, distributing mail and delivering messages; and performing other clerical duties.					
SECRETARIES AND STENOGRAPHERS Includes occupations concerned with scheduling appointments; giving information to callers; recording oral material and transcribing it in the form of written records or communications, and performing other general office work to relieve officials of clerical work and minor administrative detail.	4610				
TYPISTS Includes occupations involving typing letters, reports, stencils, forms, addresses, or other straight-copy material from rough draft, corrected copy or voice recording. May perform other clerical duties as assigned.	4622				
DATA TYPISTS (KEYPUNCH OPERATOR; MAGNETIC TAPE COMPOSER OPERATOR; TERMINAL OPERATOR; VARITYPE OPERATOR; ETC.) Includes occupations involving operating alphabetic and numeric keypunch machines, photo-composing perforator machines, special data-preparation equipment to prepare data processing input materials, and other data-type machines similar in operation to an electric typewriter.	4624				

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TELEPHONE OPERATORS (SWITCHBOARD OPERATOR; ETC.) Includes occupations involving operating telephone switchboard equipment. May operate telegraph equipment. May include providing information and establishing local or long-distance telephone connections, sorting, routing, and classifying telegraph messages, and tending switching equipment.	4652				
BANK TELLERS Includes occupations involving receiving and disbursing money in banks and financial institutions, and recording transactions.	4682				
CASHIERS Includes occupations involving receiving and disbursing money in establishments other than banks and financial institutions and selling tickets for travel on ferryboats, rapid transit commuter railroads, and local buses, for entertainment establishments.	4683				
BOOKKEEPERS AND ACCOUNTING AND AUDITING CLERKS Includes occupations involving computing, classifying, and recording numerical data to keep sets of financial records complete. Includes verifying transactions recorded by other workers.	4712				
COMPUTING AND OFFICE EQUIPMENT OPERATORS **Computer and Peripheral Equipment Operators** Includes occupations concerned with operating electronic, optical, and electromechanical machines that record, store, process, and transcribe data from punchcards, paper tape, magnetic tape, or other sources; solve mathematical, engineering, accounting, or technical problems; keep records; or supply information. This includes machines that transcribe data to or from punchcard or tape for use in automatic data-processing equipment.	4850				
Other Office Equipment Operators (Operator Supervisor; Billing, Posting and Calculating Machine Operator; Duplicating and Mail Machine Operator, Etc.) Includes occupations concerned with operating office machines as a substantial part of their work.	4802				
OTHER CLERICAL OCCUPATIONS (CLERICAL SUPERVISOR; CORRESPONDENCE CLERK; RECEPTIONIST; ORDER CLERK; RECORD CLERK; POSTAL CLERK; MESSENGER; DISPATCHER; INSURANCE ADJUSTER; ETC.) Includes all others performing other clerical duties.	4702				
SERVICE OCCUPATIONS, EXCEPT PRIVATE HOUSEHOLD This group includes occupations involving providing services to individuals and current maintenance and cleaning for buildings.					
FIREFIGHTING AND FIRE PREVENTION OCCUPATIONS (FIRE INSPECTOR; ARSON INVESTIGATOR; ETC.) Includes occupations concerned with providing protection against fire, fighting fires, protecting lives and property, inspecting firefighting equipment, and detecting fire hazards.	5110				

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POLICE AND DETECTIVES Includes occupations concerned with protecting the public, and private property; maintaining law and order in a municipality, rural, or unincorporated district; directing and controlling traffic; and maintaining order in court.	5120				
GUARDS Includes occupations concerned with protecting property from illegal entry, fire, and theft; insuring safety of people and property; guarding railroad crossings to warn motorists and pedestrians of approaching trains; guarding, disciplining, and maintaining custody of prisoners in jails, reformatories, or penitentiaries; and conducting private investigations.	5130				
WAITERS AND WAITRESSES Includes occupations involving serving food and/or beverages to patrons. In addition, usually takes order from patron and makes out check, answers inquires relative to items on the menu, and otherwise attends to the wishes of patrons. May set table with linen and silverware and take payment from patrons.	5213				
COOKS (SHORT ORDER COOK; ETC.) Includes occupations involving planning menus, estimating consumption, and cooking meals in hotels, restaurants, hospitals, nursing homes, and other institutions and establishments; and preparing and baking bread, rolls, muffins, biscuits, cakes, cookies, pies, and puddings according to recipe by measuring and mixing ingredients, shaping and molding dough into desired shapes, and placing pans of dough in oven. May specialize in a particular area. Also, includes occupations involving preparing and cooking to order all kinds of foods which require only a short time to prepare. May take order and serve patron at counter.	5214				
HEALTH SERVICE OCCUPATIONS **Nursing Aides, Orderlies, and Attendants** Includes occupations involving providing auxiliary services in the care of patients. Activities include: answering patients call-bells, serving and collecting food trays, feeding patients, and performing other routine tasks. Orderlies are primarily concerned with the care of male patients, setting up of equipment, and relieving nurses of heavier work.	5236				
Other Health Service Occupations (Dental Assistant; Ambulance Attendant; Physical Therapy Aide; Etc.) Includes occupations concerned with providing health services to assist medical practitioners.	5231				
CLEANING AND BUILDING SERVICE OCCUPATIONS (JANITOR; CLEANER; ELEVATOR OPERATOR; EXTERMINATOR; ETC.) Includes occupations concerned with cleaning and maintaining upkeep of hotels, motels, tourist homes, lodging houses, apartment and office buildings; control of pests and vermin; and operating elevators.	5240				
COSMETOLOGISTS AND RELATED OCCUPATIONS, *EXCEPT* BARBERS (HAIR STYLIST; BEAUTICIAN; MAKE-UP ARTIST; ETC.) Includes occupations involving providing beauty services for customers, including suggesting hair styles; cutting, trimming, shampooing, bleaching, and dyeing hair; and applying lotions and creams to customer's face and neck. May specialize in dressing hair according to latest style of period or a new style especially for patron. Include hair stylists in unisex establishments. Exclude barbers.	5252				

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OTHER SERVICE OCCUPATIONS, *EXCEPT* PRIVATE HOUSEHOLD (SERVICE OCCUPATION SUPERVISOR; BARBER; BARTENDER; KITCHEN WORKER; GUIDE; USHER; ATTENDANT; WELFARE SERVICE AIDE; ETC.) Includes all other occupations involving providing personnel and protective services to individuals and current maintenance and cleaning for buildings, residences. Include barbers.	5202				
AGRICULTURAL AND FORESTRY OCCUPATIONS, FISHERS, AND HUNTERS This group includes occupations concerned with the production, propagation, gathering, and catching of animals (land and aquatic), animal products, plant products (crop, timber, and ornamental); the provision of services associated with agricultural production, and game farms, fisheries and wild life conservation.	5502				
CONSTRUCTION AND EXTRACTIVE OCCUPATIONS This group includes occupations that normally are performed at a specific site, which will change over time. This is in contrast to production workers, where the work normally is delivered to the worker at a fixed location.		[redacted]	[redacted]	[redacted]	[redacted]
BRICKMASONS, STONEMASONS, AND HARD TILE SETTERS Includes occupations concerned with the preparing and laying brick, concrete block, hard title, marble and related materials, using trowels, levels, hammers, chisels and other handtools. Activities include mixing mortar, cutting materials to shape; laying out, aligning, and setting materials.	6110				
CARPENTERS AND RELATED WORKERS (DRYWALL INSTALLER; ETC.) Includes occupations concerned with erecting and repairing wooden structures, installing fixtures, floors, and drywall using saws, plumes, hammers and other carpentry tools.	6120				
ELECTRICIANS Includes occupations involving installing and repairing wiring for distributing electrical power in buildings and ships.	6132				
PAINTERS, PAPERHANGERS, AND PLASTERERS Includes occupations concerned with applying protective or decorative materials, such as paint, plaster, and wallpaper to surfaces, except in production settings.	6140				
PLUMBERS, PIPEFITTERS AND STEAMFITTERS Includes occupations involving installing and repairing plumbing end related fixtures end fittings for water, gas, steam or similar systems.	6150				
OTHER CONSTRUCTION AND EXTRACTIVE OCCUPATIONS (CONSTRUCTION SUPERVISOR; CONSTRUCTION INSPECTOR; INSULATION WORKER; CONCRETE FINISHER; ROOFER; STRUCTURAL METAL WORKER; CONSTRUCTION TRADES HELPER; OIL WELL DRILLER; MINING MACHINE OPERATOR; ETC.) Includes all other occupations that normally are performed at a specific site, which will change over time.	6002				

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TRANSPORTATION AND MATERIAL MOVING OCCUPATIONS This group includes occupations concerning the operating and controlling of equipment used to facilitate the movement of people or materials and the supervision of these workers.					
TRUCK DRIVERS Includes occupations involving operating automotive trucks including semi-tractor and trailer trucks, dump trucks, flat bed trucks, tank trailer trucks, dump trucks, flat bed trucks, tank trucks, tow trucks, etc.	6412				
BUS DRIVERS Includes occupations involving transporting passengers by bus including school, inter and intra city, and private.	6415				
TAXICAB DRIVERS AND CHAUFFEURS Includes occupations involving operating automobiles, limousines, and hearses to transport passengers and merchandise and driving new automobiles between production and customer delivery.	6416				
OTHER TRANSPORTATION AND MATERIAL MOVING OCCUPATIONS (TRANSPORTATION AND MATERIAL MOVING OCCUPATIONS SUPERVISOR; PARKING LOT ATTENDANT; RAIL VEHICLE OPERATOR; BOAT AND BARGE OPERATOR; AIRPLANE PILOT; NAVIGATOR; TRANSPORTATION INSPECTOR; TRANSPORTATION OCCUPATIONS HELPER; OPERATING ENGINEER; ETC.) Includes all other occupations concerning the operating and controlling of equipment used to facilitate the movement of people or materials and the supervising of those workers.	6402				
MECHANICS AND REPAIRERS This group includes occupations concerned with the adjustment, maintenance, part replacement, and repair of tools, equipment, machines. Installation of such equipment may be included in this division if installation is usually done in conjunction with other duties of the repairers. Inspectors of such equipment are included if knowledge of equipment functioning is necessary to conduct inspection tests.					
AUTOMOBILE MECHANICS Includes occupations involving repairing and maintaining the operating condition of gasoline powered automobile vehicles.	6711				
TELEPHONE LINE INSTALLERS AND REPAIRERS Includes occupations involving in the installation and repair of telephone and telegraph lines, cables, and other equipment used for transmitting messages.	6757				
OTHER MECHANICS AND REPAIRERS (MECHANICS AND REPAIRERS SUPERVISOR; BUS, TRUCK, AND STATIONARY DIESEL ENGINE MECHANIC; AUTOMOBILE BODY AND RELATED REPAIRER; AIRCRAFT MECHANIC; INDUSTRIAL MACHINERY REPAIRER; AUTOMOBILE-SERVICE-STATION ATTENDANT; ELECTRONIC AND ELECTRICAL EQUIPMENT REPAIRER; COMMUNICATIONS EQUIPMENT REPAIRER; HEATING, AIR-CONDITIONING, AND REFRIGERATION MECHANIC; PRECISION INSTRUMENT REPAIRER; MECHANICS AND REPAIRERS HELPER; ETC.) Includes all other occupations concerned with the adjustment, maintenance, part replacement, and repair of tools, equipment, and machines.	6702				

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PRODUCTION WORKING OCCUPATIONS This group includes occupations concerned with setting up, operating, and tending of machines and hand production work usually in a factory or other fixed place of business.					
TOOL AND DIE MAKERS Includes occupations involving precision constructing of machine-shop tools, jigs, and fixtures, instruments, and metal-forming dies.	7211				
MACHINISTS (INSTRUMENT MAKER; MAINTENANCE MACHINIST; ETC.) Includes occupations involving precision shaping of metal parts or products by milling, turning, planning, abrading, boring, chipping, sawing, and shaving with a variety of metal-working machines.	7213				
MACHINE OPERATORS AND TENDERS (CEMENTING AND GLUEING MACHINE OPERATOR; METAL FABRICATING MACHINE OPERATOR; WOODWORKING MACHINE OPERATOR; PACKAGING AND FILLING MACHINE OPERATOR AND TENDER; TEXTILE, APPAREL, AND FURNISHINGS MACHINE OPERATOR; PRINTING MACHINE OPERATOR; MACHINE OPERATORS AND TENDERS HELPER; ETC.) Includes occupations concerned with operating and tending of machinery and equipment. These jobs involve the controlling and adjusting of machines and equipment, but do not involve the setting up or adapting the machine to a new or different type of operation.	7502				
WELDERS AND CUTTERS (BRAZIER; ETC.) Includes occupations involving welding and cutting.	7714				
ASSEMBLERS Includes occupations concerned with assembling products.	7720				
PRODUCTION INSPECTORS, TESTERS, SAMPLERS, AND WEIGHERS Includes occupations concerned with the inspecting, testing, examining, sampling and other similar activities of processed, machined, fabricated and assembled products.	7800				
OTHER PRODUCTION WORKING OCCUPATIONS (PRODUCTION OCCUPATIONS SUPERVISOR; MACHINE SET-UP OPERATOR; FABRICATOR; DENTAL LABORATORY TECHNICIAN; TAILOR; BAKER; PRECISION INSPECTOR; PLANT AND SYSTEM OPERATOR; FABRICATORS, INSPECTORS, AND PLANT OPERATORS HELPER; ETC.) Includes all other occupations concerned with setting up, operating, and tending of machines and hand production work usually in a factory or other fixed place of business.	7802				
MATERIAL HANDLERS, EQUIPMENT CLEANERS AND LABORERS This group includes occupations concerned with performing routine, nonmachine production tasks involving minimal judgment. These jobs require only a minimal amount of occupational training as well as minimal amount of general educational development. Most of the occupations in this group require lifting and carrying. These workers usually work in production activities rather than in offices, stores, or on farms.					

Occupations and Definitions	Office Use Only	Current Job Openings (ready for immediate filling)			Job Openings with Future Starting Dates (not included in Col. 1)
		Total Current Job Openings (1)	Included in Col. 1, Unfilled a Month or Longer (2)	Included in Col. 1 for Part-time Positions (3)	(4)
CONSTRUCTION LABORERS Includes occupations involving assisting construction workers to build or repair buildings, roads, bridges, dams, and other construction projects, and performing other elemental tasks at construction sites. Helpers with specific trade skills are classified in construction occupations.	8100				
FREIGHT, STOCK, AND MATERIAL HAND MOVERS; VEHICLE WASHERS AND EQUIPMENT CLEANERS; AND MISCELLANEOUS MANUAL OCCUPATIONS (STEVEDORE; GARBAGE COLLECTOR; STOCK HANDLER; MACHINE FEEDER; HAND PACKER; LABORER, *EXCEPT* CONSTRUCTION; ETC.) Includes occupations concerned with moving, shelving, loading, and unloading materials manually. Also, includes occupations involving washing, or otherwise cleaning vehicles, machinery and other equipment using water or other cleaning agents, brushes, cloths, hoses, and other cleaning equipment. Also, includes all other occupations concerned with performing routine, nonmachine production tasks involving minimal judgment.	8402				
LIST ANY JOBS THAT YOU COULD NOT FIT IN A CATEGORY ABOVE:					
TOTALS (If "none," enter "0.")					

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